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Educational and Psychological Testing

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FOREWORD

The preceding two triennial issues on this area of research were criticized by their appointed critics for registering a series of refinements rather than breakthroughs in research done on "Educational and Psychological Testing" during the periods they reviewed. It occurred to the chairman for this issue that the criticism might have resulted from continuing to try to fit the ramifying efforts in the area to a pattern of chapter categories in effect since at least February 1941 by his memory. Continuous updating within increasingly restrictive limits would produce the effect of refinement within such limited areas if breakthroughs meant breaking over outmoded bounds into new categories of development and application.

The present issue's revised chapter outline is an effort to define more meaningful categories: the first five following the introductory overview being devoted to successive stages in the educational careers of students from early childhood to professional education, the remainder, except for the final critique, having to do with areas of special application or concern. Only the chapter on methodology and technology bears close resemblance to a counterpart in preceding issues. It was prepared by the preceding chairman who authored the related chapter in the February 1965 issue, but even it differs in its inclusion of technology as well as methodology of test development and research.

In keeping with recent trends in the REVIEW, chapter authors have been encouraged to consider evaluation of a smaller number of works preferable to enumeration of a larger number. The larger number of chapter divisions has enforced smaller page allotments to the several authors and corresponding space pressure when each chapter must be introduced in a manner appropriate to its content and organization. It may be found, too, that a certain inefficiency of overlap between chapters and with chapters in other issues of the cycle results from the new chapters chosen. This must be weighed against the value of treatment in this issue, with its tradition of describing the state of the art in educational and psychological testing, of problems in evaluation and measurement otherwise treated incidentally, if at all, in issues with other organizing foci.

In conclusion, the chairman expresses his appreciation to the authors of the chapters for accepting the challenge of preparing summaries in areas not defined by past issues. To the editor go thanks not only for assistance, but forbearance in bringing the issue to fruit.

WARREN G. FINDLEY, *Chairman*
Committee on Educational
and Psychological Testing

CHAPTER I

Overview of the Research on Educational and Psychological Testing

WARREN G. FINDLEY AND BERTRAM B. MASIA

The period of publication under review in this issue, roughly July 1964 through June 1967, has been allocated to many chapter authors under a new outline that leaves for this chapter more of an introductory function and less substance of its own than in corresponding issues in other cycles. Here, then, you will find some commentary on general trends and some references of a nature too general to fit any of the chapter categories, but also a pointing to major studies and their publications in the new organization of this issue.

Major Works and Studies

Buros' (1965) *Sixth Mental Measurements Yearbook* must be accorded its preeminent place in the series begun in 1938 and preceded by earlier explorations by the same author. This latest edition is larger and more comprehensive in every way, in keeping with the growth of the field, containing a listing of 1,219 tests, 795 original test reviews written by 396 topflight reviewers, plus excerpts from 97 test reviews originally published in 30 different journals. A total of 8,001 references on the construction, uses, and limitations of specific tests are included and are indexed, along with the tests and books reviewed and the reviews themselves, by author. Other indexes include an index of titles, a classified index of tests, and a publisher's directory and index. Book review excerpts have been cut to make space for test reviews, the critical standards applied to reviews resulting in publication of excerpts on only 193 of the 527 books listed. An interesting footnote is that the major classification area with the largest number of listed tests is Personality, with 196, although these tests are most subject to criticism for validity. However, the area of academic achievement, subdivided for more ready reference, is really the dominant area, with over 500 listings. Vocational testing accounts for 179 entries, intelligence and multi-aptitude batteries account for 147, and the remainder are miscellaneous. The major achievement and multi-aptitude batteries are allotted review space more proportional to the extent of their use.

The compilation of papers from the 1947-64 Invitational Conferences on Testing Problems by Anastasi (1966) brings the highlights of these conferences into more available form in this hardback edition. The sampling of 58 of the 126 papers presented runs the gamut of the chapter topics but is most applicable to Chapter XI. The oft-quoted Chapter V of Gage's (1963) *Handbook of Research on Teaching* has been reprinted in 1966 as a paperback under its own title (Campbell and Stanley, 1966). The Seventh Phi Delta Kappa Symposium, edited by Stanley (1967), contains discussion of many issues in the training of specialists in research design; it contains also an especially significant added chapter by Campbell (1967) on continuous administrative research and the inferential rationale for decision making based on such research, including illustrative real problems involving educational and psychological measurement.

Collections of readings in various related areas are coming out in increasing profusion and timeliness. The one by Mehrens and Ebel (1967) is generally useful. One by Saltzman and Peters (1967) contains a section on pupil appraisal and an excellent discussion of evaluation by Reynolds.

Bloom (1964) might well have been cited in several chapters, especially in view of his documented statement regarding the proportion of variance in adult mental competence accounted for by early development—50 percent by age four, 80 percent by age eight. This synthesis of longitudinal studies brings a coherence to our interpretation of the impact of environment on developed abilities not heretofore available and provides a series of benchmarks against which the effects of current innovative interventions may be evaluated.

McKee and Brzeinski (1966) reported a major intervention, a six-year longitudinal study, supported by the Cooperative Research Program of the U.S. Office of Education, in which they found that children could profitably begin the study of reading at age five in kindergarten under a carefully designed program. Especially significant is their finding that children given the same special program in reading beginning at grade 1 far excelled by grade 5 those who were given an early start in kindergarten but put in regular classes in grade 1. Early (kindergarten) and continuous (through grade 5) planned stimulation brought reliably greatest achievement at grade 5 in reading, vocabulary, language, and social studies. Effects in arithmetic and science were also favorable, but not subject to the same simple summary statement. Spelling appeared unaffected. Possible unfavorable side effects were explored and found nonexistent. A negative critique of this study is presented by Mood (1967), but Schoephoerster, Barnhart, and Loomer (1966) found confirming evidence.

Coleman's major federal study of *Equality of Educational Opportunity* is treated at some length in Chapter IV, as are several publications of Project Talent by Lohnes, Gribbons, and Shaycoft. Further references to Project Talent are Flanagan and Cooley in Chapter V and Cooley and Miller in Chapter XI. A significant longitudinal study by Droege of the *General Aptitude Test Battery* is discussed in both Chapters IV and X.

Finally, what promises to be only the first of a series of significant international studies, in mathematics, reported by Husén, is discussed in Chapter VIII. The collaborators are to be commended for their systematic discussion of the factors affecting comparisons, the corrections used, and the carefully worded interpretations of differences found. The development and measurement of interests receives major attention in Chapters IV and V, as one might expect, but the reader is referred for related material to Chapters VI, X, and XI.

The significant taxonomy of educational objectives for the affective domain prepared by Krathwohl, Bloom, and Masia (1964) and discussed in the corresponding issue in the preceding cycle of the REVIEW was subjected to extensive critiques by Findley (1964) and Woodruff (1964). Both critics were generally favorable but suggested issues of interpretation and basic properties, even ethics of measurement in this area.

Testing and the Public Interest

The final note above leads naturally into a discussion of the place of educational and psychological testing in American life today. Since the social consequences of testing are a relatively new area of interest, intensified by widespread criticism of tests and testing in the mass media, it is not surprising that much of the literature is speculative and argumentative. Only a handful of research studies have thus far appeared.

Empirical Studies

A program of studies on the effects of ability tests on individuals, groups, organizations, and society was launched in 1962 by a group of sociologists at the Russell Sage Foundation. Empirical studies have begun to appear, with the promise of two or three major volumes in the next year or two. Previews of these forthcoming volumes were given by Goslin and Glass (1967) and by Brim (1965) in summaries more condensed than the reference to Goslin, Epstein, and Hallock in Chapter II. These workers reported partial findings from two national opinion surveys, one of 1,500 adults and the second, from Project Talent data, of 10,000 high school students from 40 public, 10 private, and 10 parochial schools. Large-scale antitesting sentiment was found to be present in both samples. The major cognitive dimensions of criticism were identified as were the basic sources of such criticism. On this matter Fiske (1967) found that negative reactions to tests were related to the magnitude of the potential consequences of the testing. Another finding reported by Goslin and Glass, not surprising to those conversant with attitude change theory, is that the child's self-estimate of his abilities is not appreciably affected by his knowledge of his test performance.

Neulinger (1966), utilizing the Russell Sage high school sample, investigated the opinion of youth on the fairness of using intelligence tests to help make decisions in educational, occupational, and other areas. He found that sentiment toward testing varied considerably with the decision to be made. A serious limitation of both the Goslin and Glass and the Neulinger studies lies in the use of questionnaires containing highly structured items. The nature of the cognitive structures embedded in the sentiments could not be ascertained. Furthermore, these studies did not take into account the importance, or lack thereof, attached to the sentiment by its holder and the quality of his knowledge and understanding of and thinking about tests.

Moving to the institutional level, Goslin and Glass found few schools with a rationally based policy on disseminating test results. In a study of counselor and teacher behavior with tests, Goslin (1967) reported an absence of congruence between the behavior and opinions about tests.

Guidelines and Standards

Guidelines and standards for test development and use are very much in the public interest, particularly if they are sponsored and endorsed by professional membership organizations. One such set of guidelines which has been badly needed for many years was the one by Deutsch and others (1964) on testing minority children. Emphasis in these guidelines was on reliability of differentiation, predictive validity, and the validity of test interpretation.

The promise of guidelines is in intellectual and moral terms, but the effects toward protecting the public interest are hardly discernible. No wonder the public turns against tests when there is suspicion that test specialists and publishers give no more than lip service to abiding by technical standards laid down by colleagues with commitments to the public interest.

What constitutes the public interest with regard to tests and testing is itself a complex problem. The New York City Board of Education decision to dispense with group intelligence tests is a case in point. Loretan (1965) argued for the ban, and Gilbert (1966) made a case to restore the tests. Loretan's position would be justified if the action led, as Loretan (1966) suggested, to the development of instruments that possessed greater validity for instructional decisions than do group intelligence tests.

Symposia and Special Journal Issues

A decided characteristic of the period covered by this issue was the large amount of professional meeting time and journal space devoted to testing and the public interest. The most dramatic event was the special (November 1965) issue of the *American Psychologist*, devoted entirely to "Testing and Public Policy," which reported and commented on the Congressional hearings on personality tests and on tests and the invasion of privacy of government employees.

At the 1964 annual meeting of the American Psychological Association, its Board of Professional Affairs sponsored a program on "Psychological Tests and Public Responsibility." On this occasion Messick (1965) argued against self-regulation by the psychological profession and in favor of educating the public as to the nature of tests and the reasons why tests are used. Ebel (1964) and Newman (1966) shared this view. Dyer (1967) argued that it is in the public interest for the consumer to see testing "as a form of continuous feedback that is indispensable to the management of learning here and now."

A symposium on invasion of privacy in research and testing, sponsored by the National Council on Measurement in Education, was reported in a journal supplement edited by Willingham (1967). Seven contributors were represented in this symposium. On that occasion Tillery presented a rationale for conducting research that recognizes both the right of privacy of the respondent and the right of the social scientist to inquire about man. In this connection, Westin (1967) recently completed a massive study of privacy in the United States and how technological developments threaten it.

Concluding Remarks

The remainder of the volume involves chapters whose contents are quite readily inferred from their titles. The reader is simply advised to note the dual organization, by career levels and by topics, for purposes of cross-checking. Points at which special need for cross-checking exists have been pointed out earlier in this chapter. The chapters beginning with Chapter V bring together studies that under other arrangements might not have received the systematic evaluation they deserve from persons concerned with measurement primarily. Measurement, properly a tool of other purposes, benefits from the measurement specialist's review as well as the type of review that relates it to its substantive correlates.

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CHAPTER II

Testing the Early Educational and Psychological Development of Children–Ages 3-6

THERRY N. DEAL and PAUL L. WOOD

This chapter is organized into three major divisions: testing related to ability or intellectual structure in the child, especially general ability; testing related to socioemotional dimensions of personality; and testing related specifically to educational achievement.

Intellectual Structure

A general overview of trends in testing for the age group considered was obtained by a perusal of *The Sixth Mental Measurements Yearbook* (Buros, 1965). This overview indicated that general ability tests rather than specific ability tests were given primary consideration. Individual testing continued to be the most frequently used procedure; among the tests reviewed for children under five years of age, only two general ability tests were suggested for use in group testing situations.

Since the publication of Buros, the *Wechsler Preschool and Primary Scale of Intelligence* has appeared (Wechsler, 1967). Eight of the subtests parallel the *Wechsler Intelligence Scale for Children (WISC)*. The standardization sample of 1,200 children was stratified on five variables in accordance with latest population statistics.

Factor Analytic Studies

The most notable trend in general intelligence testing was the use of factor analytic techniques for exploring theoretical issues related to intellectual structure.

Stott and Ball (1965) reviewed the changing concept of intelligence and the varied points of view extant on the structure of intelligence. They presented the results of a survey which indicated the 15 most frequently used tests for children under six. A final chapter was devoted to a factor analytic study of the five most frequently used mental tests for infants and preschoolers: *Cattell Infant Intelligence Scale, California First Year Mental Scale, Gesell Developmental Schedules, Merrill-Palmer Scale of Mental Tests,* and the *Stanford-Binet Intelligence Scale.* The intent of the factor analysis was to explore the factor meanings of test items throughout the preschool developmental range. Guilford's notational system was used for naming the factors identified. The summary of factor interpretations indicated that the content of tests at different developmental levels varied greatly. The authors suggested that it is the failure of tests to contain items which tap specific factors at all developmental levels rather than the absence of these factors which accounts for low correlations between infant tests and later tests of intelligence. For example, among the test scales analyzed, only at the infant level did "divergent production," a factor closely associated with creativity, seem to appear in the test materials.

Meyers and others (1964), also using Guilford's model, continued to pursue their differentiation hypothesis. They hypothesized that group factors (specific abilities) appear as early as two years of age and continue to differentiate with increasing age. The general hypothesis of a group structure of abilities was supported. There was not support for increasing differentiation with age; the authors suggested that the number of variables might have been inadequate for this purpose or that integration and consolidation of differential abilities was occurring with the older children.

Osborne (1965), in a longitudinal analysis of scores on the *WISC*, found that six factors identified at the preschool level remained stable after first grade. However, a greater number of factors were visible in the first-grade analysis, and continued differentiation of factors seemed to occur after first grade.

Quereshi (1967) hypothesized that intelligence involving the use of symbols changes in organization from a general structure toward group or specific ability factors with increasing age. The factor analysis of the *Illinois Test of Psycholinguistic Abilities (ITPA)* performed in the study supported the hypothesis.

Perhaps the most provocative research was that presented by Cattell (1967). Cattell explored his theory of "fluid and crystallized" intelligence at the five- and six-year age levels. He proposed two general factors: g_c (crystallized), which loads most heavily on culturally acquired factors; and g_f (fluid), which loads on insightful performance in which previous learning plays little part. In previous studies with older children, g_c and g_f merged at the third order. In this analysis it was not until fourth-order factors were obtained that g_c and g_f merged. The author offered tentatively the hypothesis that g_c impact is greater in terms of generating individual differences in learning at this age than at later periods in life. He interpreted the factor patterns to mean that interactions between intelligence and environment develop personality factors as well as cognitive factors in these early years.

Additional References: Ames (1966); Badri (1965); Smart (1965).

Associated Variables

A second trend which emerged in general intelligence testing was the effort to identify socioeconomic, ethnic, minority group, or sex differences as important patterning characteristics (Borum and Livson, 1965; Osborne, 1964; Semler and Iscoe, 1966; Weise, Meyers, and Tuel, 1965; Wendt and Burwell, 1964). For example, Weise and his associates, utilizing *Primary Mental Abilities Tests*, found the *P* subset to be the most valuable screening clue for girls, while the *Q* subset was the most useful for boys in predicting the *Stanford-Binet* criterion score. The criterion score was used for placing students in programs for the gifted.

The trend toward identification of variables associated with different intellectual patterns could be seen as a predictable testing correlate to the theoretical developments noted in the December 1965 issue of the REVIEW which emphasized the role of psychocultural experiences in the development and modification of intelligence.

Socioemotional Dimensions

The most significant trend noted among the studies of affective dimensions of personality was the effort to relate socioemotional variables to cognitive variables and the utilization of more sophisticated statistical tools in this process.

An additional report from the Berkeley Growth Studies indicated relationships between affective and cognitive variables (Bayley and Schaefer, 1964). The relationship obtained between intelligence and child behavior ratings compelled the authors to suggest as a hypothesis that in both emotional and intellectual aspects of adjustment and growth, male infants are more permanently affected than female infants.

The interactive nature of cognitive and noncognitive variables was again suggested by Ames and Walker (1964). A multiple correlation utilizing *WISC* and *Rorschach* scores was found to be a more effective predictor of the later reading scores of kindergarten children than either measure alone. Ames (1965) also presented findings utilizing the *Rorschach* which revealed sex differences in the "experience-balance ratio" as scored on *Rorschach* protocols.

Several studies have reported on specific technical problems in testing socioemotional variables. Eysenck and White (1964) pointed out that statistical independence does not indicate lack of interaction between cognitive and noncognitive variables. They suggested that the model of linear independence may have to be supplemented by a statistical model which includes curvilinear regression. Cattell (1965) suggested a technique for identification of personality dimensions when data from several sources are to be utilized. Digman (1965) discussed the role which behavior ratings can play in the development of personality theory. Estvan (1966) noted that affective aspects of social perception are less stable than cognitive aspects. Marshall and Doshi (1965) raised a significant question regarding what is projected in doll play. Their findings indicate that those children rated as "doing well" in a nursery school setting tend to play out their feelings while children rated by the teachers as having problems seem less able to utilize doll play in dealing with problems.

One instrument which shows promise and has been used in several studies of psychosexual development is the It Scale (Brown, 1956). The general finding that boys obtain higher masculine scores than girls obtain feminine scores continues to be a researchable problem with this scale (Endsley, 1967).

Educational Achievement

Measuring educational achievement of the three- and four-year-old is a rapidly emerging field of interest. Even within the kindergarten age range, the measurement of educational achievement is a relatively new concept. According to Goslin, Epstein, and Hallock (1965), little use of tests beyond reading readiness tests and individual intelligence tests was found at the kindergarten level in samples of Connecticut, New Jersey, and New York schools. Inconsistent with the limited availability of tests for educational achievement is the mushrooming of educational programs within the age range of interest. As Hechinger (1966) declares, "preschool education has become a fact. . . ." (p. 1).

The most central theme of educational measurement at the preschool level was the use of measures of intellectual ability for overall program evaluation. However, Schwertfeger and Weikart (1967) presented evidence in the Ypsilanti Study that differences on intelligence scores using the *Stanford-Binet* tended to disappear between pilot and control groups by the end of the second grade, whereas achievement tests at the end of the second grade gave significant differences in favor of the pilot group. The use of measures of intelligence as controls for program effectiveness is probably a result of the lack of available achievement measures.

Due to the popularity of the *Peabody Picture Vocabulary Test (PPVT)* in Head Start and other preschool programs, a word of caution must be expressed about using IQ scores at the lower age range. Small differences in chronological age can yield large IQ differences with the same raw score. As noted in Buros (1965), with the same raw score of 50 there is a difference of 12 IQ points (Form B) between CA's of 5-5 and 5-6, with even larger IQ differences at the lower end of the CA range (p. 821). The Institute for Developmental Studies* (1965a) circumvented this limitation by using *PPVT* raw scores.

The *ITPA*, which has been used in Bereiter's program (Hechinger, 1966) and numerous other preschool programs, was given a very critical review by Weener, Barritt, and Semmel (1967) with a response from McCarthy. Weener and his associates pointed out that reported research indicates that the *ITPA* is being used as a fully operational instrument although the manual is labeled "Experimental Edition." These reviewers encouraged work on defining the meaning of subscale scores and the use of cross-validation techniques with the *ITPA*.

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The measurement problem entailed in evaluating creativity in young children was discussed by Starkweather (1964). School readiness continues to receive attention, with developmental tests based on limited sampling by Ilg and Ames (1964). The concept of school readiness is somewhat outdated by preschool programs and must be replaced by diagnostic tests of specific skills which will give a basis for planning individualized programs.

Some developments that deserve recognition include Wallace's (1965) discussion of measurement techniques involved in concept formation with references to Piaget's theory. Banta's (1966) work on the concept of autonomy should add new dimensions to the evaluation of preschool programs. Brown's (1965) review of past and current research in speech and language development should provide an impetus for measurement development. The Institute for Developmental Studies (1965b) continues to develop some original techniques and testing devices for use with young children including obtaining continuous speech samples with the clown technique and telephone interview. This Institute has developed and adapted various perceptual-sensorimotor-learning measures of interest in measurement of specific skills.

Additional References: Bruce (1964); Wilson and Robeck (1964).

Summary

Some important contributions have occurred in the area of research dealing with the structure of intelligence. A strong case for several primary ability factors in the child under six was found. Efforts to provide additional information using either Guilford or Cattell's model are encouraging. It is unfortunate that no major test device utilizing Piaget's theory has made its appearance. There appeared to be a significant trend toward identification of test patterns related to variables previously used as controls, specifically socioeconomic status, sex, ethnic group, and minority group membership.

Affective dimensions or noncognitive variables have received less attention than general ability. A trend toward exploring the interaction of cognitive and noncognitive dimensions of personality seems to be emerging.

In the area of educational achievement there is a deficit in tests for other than kindergarten children. Most of the programs now focusing on young children are utilizing general ability instruments. Because of the vast number of programs now in progress it can be anticipated that the next review will include more achievement type devices.

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CHAPTER III

Testing the Educational and Psychological Development of Preadolescent Children–Ages 6-12

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Over the past three years, the need for educational and psychological measurement has been highlighted in school systems across the country in their attempts to evaluate a great variety of educational programs. The Elementary and Secondary Education Act (ESEA) of 1965 has been primarily responsible for vigorous efforts at assessment and evaluation of program activities, the latter directed in large measure toward children in elementary age levels and younger. Unfortunately, the research over the three-year review period has not reflected the concerns of the field evaluator, nor have the studies been of particular relevance in terms of input in the evaluation process. There is a great need to wed the talents of the university-based researcher and the school evaluator if we are ever to separate the wheat from the chaff in compensatory and innovative educational programs.

In deciding what topics to include in this chapter, we have necessarily been arbitrary and have reviewed only those areas thought to be of most current interest and importance.

Cognitive Domain

Educational Achievement

During the past few years, the measurement of educational achievement has taken on an importance which transcends local interest and use. Standardized achievement tests have been the key source of data for evaluating the success of federally funded programs, particularly those under Title I of ESEA. The thought that billion-dollar expenditures for education may be contingent in part upon the rise of tested pupil achievement makes one wish more confidence could be placed in such measures both in terms of their proper use and interpretation and of their relevance in measuring important educational outcomes.

Three studies are reported as representative of the types of pitfalls encountered in using achievement tests for evaluation. Bernard (1966) tested 1,200 fourth- and fifth-graders in June and September to determine whether predicted September scores would be the same as in June. He concluded that "the attempted use of extrapolation to connect spring and fall testing to a common base is a dismal failure and can be extremely misleading."

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He warned that test publishers' norms are relevant only to the time on which they are based. The importance of content validity for achievement tests is well recognized, yet a persistent problem is how much and what kind of item-to-item correspondence is needed to establish content validity. Hopkins and Wilkerson (1965) studied the concept of differential content validity of the Spelling Test of the *California Achievement Tests (CAT)*. Among other things, they found that the number of taught and untaught words in a particular school system and use of different forms of the test resulted in measured achievement differing by two to three months. Dizney and Fleming (1964) administered the *California Test of Mental Maturity (CTMM)* to obtain predicted achievement and the *CAT* to obtain grade placement of a group of fourth-graders. They found that discrepancy scores were significantly different between boys and girls and between intellectual levels.

The growing need for achievement measures to parallel individualized instruction led Cox and Graham (1966) to employ Guttman's technique of scalogram analysis. They ordered 10 objectives thought necessary to add two digit numerals and wrote corresponding test items. Based on later empirical ordering of the items, they obtained a reproducibility coefficient of 0.97. The technique is promising but will be more difficult in other subject areas where the logic of the item sequencing may be more difficult to establish and where it may differ from pupil to pupil.

The prediction of achievement continues to dominate the literature. Churchill and Smith (1966) found that the *Stanford-Binet Intelligence Scale (SB)*, 1960 revision, the *Lorge-Thorndike Intelligence Tests (L-T)*, and the *Iowa Tests of Basic Skills (ITBS)* given to third-graders predicted their six-grade achievement on the *ITBS* about equally well. Matlin and Mendelsohn (1965) found that personality adjustment is more strongly related to teacher marks than to standardized achievement test scores. Ames and Walker (1964) found that fifth-grade reading achievement was predicted about as well by a *Rorschach* prognostic index as by the *Wechsler Intelligence Scale for Children (WISC)*, both administered while the subjects were in kindergarten. Further, the *Rorschach* score added significant unique variance to the prediction of reading.

The notion that personal teacher remarks made on pupils' completed work may increase their achievement was studied by Waterman, Northrop, and Olson (1967). Comparing scores on an objective test with those of a control group receiving no personal remarks but only letter grades, they found no significant differences.

Proper administration of achievement tests continues to be a problem. One solution which is growing in popularity is the use of television. Fargo and others (1967) studied the comparability of group television and individual administration of the *Peabody Picture Vocabulary Test* with third-, fourth-, and fifth-graders. Analysis of variance indicated test results were comparable.

Creativity

The literature continues to pursue the problem of establishing the construct validity of creativity. Factor analytic studies abound, with investigators generally in one of two camps: those committed to the creativity construct and those convinced that creativity scores contribute little more to the measurement situation than is now being done with conventional aptitude and achievement tests. Certainly a major problem is one of definition and the identification of reliable criteria. Yamamoto (1965) argued, for example, that inappropriate criteria such as grades and amount of production are frequently used. He stated that the dimensions of creativity must be clearly formulated so that judgments of brightness, good personality, or active participation are not construed as creativity. In spite of the nagging criterion problem, researchers continue to assume that creativity tests measure creativity in much the same manner that intelligence is what is measured by intelligence tests.

One methodological problem in studying the relation of intelligence to creativity has been the restricted range of (high) IQ's often used by investigators, leading to spuriously low correlation between intelligence and creativity. Wodtke (1964) gave the Torrance test batteries, verbal and nonverbal, on a test-retest basis and an intelligence test to an unrestricted range of fourth- and fifth-graders. Test-retest reliability ranged from the upper 0.40's to the upper 0.60's for total scores on the Torrance tests, raising questions of their use with individual pupils at younger ages. Using the Water Jar test and samples of creative writing as criteria, Wodtke saw no convincing evidence of the uniqueness of creativity as compared to intelligence. Ohnmacht (1966) in a similar study with unrestricted range also found that two creative thinking tests (Word Association and Uses for Things) were highly saturated with common factor variance, as were measures of conventional achievement and intelligence. Further, he found that creative thinkers showed no less anxiety than others.

Cicirelli (1965) studied both the hypothesis that creativity and IQ interact to affect achievement and also the notion of an IQ threshold where creativity begins to affect achievement and where IQ loses its effect. His results, based on sixth-grade pupils, generally implied additivity and linearity rather than interaction and threshold. Iscoe and Pierce-Jones (1964) found significantly higher divergent thinking scores among five- to nine-year-old Negro children as compared to white children. Low but significant correlations of divergent thinking with the *WISC* were noted for both races, thus raising doubts that creativity is a simple function of age or intelligence.

Creativity was studied in relation to other types of variables. Stroup and Pielstick (1965) found no significant relation between four tests of creativity and motor ability as measured by the Brace test. Cicirelli (1966) determined the frequency of choice of conventional and unconventional careers among 604 sixth-graders. There was some evidence that creative pupils tended to select more unconventional careers. Yamamoto, Lembright, and Corrigan (1966) found no relation between creativity and sociometric choice, while Long and Henderson (1965) did find significant relations between opinion formation and scores on the Torrance Lines Test. See the section on School and Home Environment for a report on teacher impact on creativity.

Additional Reference: Wallach and Kogan (1965).

Intellectual Development

Some of the persistent problems in measuring intellectual growth were outlined by Thorndike (1966). He pointed out that studying growth in ability was made difficult by (a) unreliability of measures, (b) inequality of units in which measures are expressed, and (c) nonequivalence in what is measured by different instruments and at different levels. In analyses of the Harvard Growth Study data he estimated that the maximum reliability of intellectual growth measures was about 0.25 to 0.30.

The stability of *L-T* IQ scores from grades 3 and 4 to grade 8 was studied by Eagle (1966). He calculated estimated true changes and found that both verbal and nonverbal IQ's tended to rise. He also found that nonverbal changes were more than three times as great as verbal changes. Further, he found no correlation between verbal and nonverbal IQ change scores. Smart (1965) factor-analyzed IQ test results of two groups of children at successive ages from 3 to 12 and 6 to 18 years. Both analyses yielded two factors which were highly similar—nonverbal ability and symbolic reasoning. There is growing evidence, however, that the factorial composition of intelligence changes with age and environment. This notion is reflected in the differentiation hypothesis of intelligence which was tested by Quereshi (1967). He gave the *Illinois Test of Psycholinguistic Abilities (ITPA)* to seven age groups ranging from 2-6 to 9-0. He found that the amount of variance accounted for by a general factor decreased with age while the amount of variance accounted for by group factors increased with age.

The mental abilities of children from various social and ethnic backgrounds have been studied with obvious implications for the education of disadvantaged children. Lesser, Fifer, and Clark (1965) studied four mental abilities in first-grade children who differed in ethnic group and social class. Using a factorial design he found a social class difference in absolute level of mental abilities but not in their patterning. Ethnic group membership produced significant differences in both absolute level and patterning of mental abilities. The study showed that these mental abilities are related to each other in ways that are culturally determined. An important role of the research worker in the near future is to identify and classify those environmental conditions which produce given patterns of academic development.

Curriculum workers continue to emphasize the need to set the development of concepts rather than of factual recall as the major educational goal. There is an urgent need for research in concept attainment that will have application in the classroom. From the practitioner's viewpoint the research is sterile, ambiguous, and often contradictory. The methodologies usually employed require oversimplification of concepts to be learned in relation to the demands of school and often involve inductive and sensory modes which simply are not characteristic of the typical classroom. Stern (1965), who studied learning and transfer under concept rehearsal conditions, and Wittrock and Keislar (1965), who studied verbal cues in the transfer of concepts, are representative studies.

The work of Piaget and others has emphasized the developmental nature of concept attainment. Attainment of such concepts as time, weight, color, and distance seems closely linked to age and other factors and suggests some independence from traditional measures of intelligence. Freyberg (1966) in studying six- to nine-year-old children found that school performance is associated with aspects of conceptual development not adequately assessed by conventional intelligence tests.

Additional Reference: Bruner and others (1966).

Affective Domain

Pupil Attitudes

In addition to measurements of cognitive qualities, there are three principal affective areas with which educational and psychological testing of the elementary school child has been concerned: (a) attitudes, (b) social development, and (c) home and school environment.

In surveying the research on pupil attitudes, one becomes unavoidably concerned with personality measurement in general and encounters a plethora of studies dependent on projective techniques. Ink blots, word association, and figure drawing remain in vogue, with reliability and validity studies continuing to add little to their justification. Such research has been done largely, but by no means exclusively, with exceptional children. Regrettably, Cattell's promising factor analytic approach to personality assessment has not had the beneficial effect for which one might have hoped.

Most of the research under review in this area can be readily classified as attitudes toward others, toward self, and toward one's environment. Attitudes toward others, however, are inextricably linked to measurement of social development, to be discussed in the next section.

In spite of the great importance being ascribed to pupil self-concept, few studies have been conducted at the elementary school level during the period under review. Some concern, however, has been evident about the method of assessing self-concept. Parker (1966) considered the self-concept of sixth-graders as inferred from responses to a picture story test to be more realistic than that derived from self-rating. Perkins and Shannon (1965) found measurements by self-rating, projective technique, and multiple choice pictorial tests to be positively related to one another and to teacher ratings of pupil adjustment.

Pupils' attitudes toward their environment were studied by Jackson and LaHaderne (1967), who found teacher estimates of pupils' satisfaction with school related more closely to their academic record than to the attitudes the pupils themselves expressed. Sex differences in pupil perception of classroom environment and in perception of one another were found by Antes, Andersen, and DeVault (1965). Zeligs (1966) constructed attitude inventories in six areas and compared the responses of sixth-grade boys and girls.

Social Development

Closely related to the attitudes of the elementary school child is the area of social development. Progress from egocentricity to concern for others is accepted as an important goal in early social development. Such progress is dependent on acceptance of self and a balanced view of one's environment.

Two important measurement approaches are common in assessing social development among elementary school children. The first is the use of peer rating, peer choice, and peer descriptions in sociometry. Sutton-Smith and Roberts (1964) found children's categorization of one another by a specific set of terms to be a promising technique. Toigo (1965) used a peer-rating instrument along with other measures to inspect the relationship between social status and aggression. He found a low, significant correlation between aggression and father's educational and occupational level. Lower-status subjects were more aggressive in classrooms with predominantly lower-status peers.

Behavior analysis is a second important approach to measuring the social development of the elementary school child. Unfortunately, there seem to have been many attempts but few successes in increasing the objectivity with which pupil behavior is studied. Meyers, Orpet, and Attwell (1964) reported lower-bound estimates of reliability ranging from 0.55 to 0.84 for examiners' ratings of pupil behavior in test situations. Perkins' (1964) Teacher Categories and Student Categories instruments were found to have interobserver reliability coefficients in the 0.80's and 0.90's. Guerney and others (1965) reported a promising system for coding certain aspects of children's behavior from tape recordings.

Studying fifth- and sixth-graders, Cassel and Martin (1964) found a significant relationship between peer status ratings and achievement test scores. Ratings were also significantly related to IQ for the sixth-grade pupils, but there was no relationship between the ratings and age or learning efficiency indexes.

Ethnic attitudes are an important phase of social development. Vaughan (1964a, b) discovered that ethnic awareness among Maoris increased with age and that attitudes were significantly related to skin pigmentation and parental race. Sex and socioeconomic status, on the other hand, showed no significant relationship to attitudes.

Rogers and Long (1966) found pupils' concern for others increasing more between grades 2 and 4 than between grades 4 and 6. Their study showed pupils to have more concern for helping needy people in distant places than those closer to home. Generally, children perceived the United States as a rich country and most other countries as poor.

A similarly important phase of social development is growth in the ability to make judgments. Whiteman and Kosier (1964) studied some of Piaget's views on the development of moralistic judgments in children. They found that ability to make mature judgments increased with age and IQ but was unrelated to sex, personality ratings by teachers, and participation in Sunday school or scouting activities. On the other hand, mature judgment was positively influenced by attendance of ungraded classes.

School and Home Environment

Another important influence on school performance is the environment produced by relationships with teachers in schools and parents and siblings at home. Researchers have attempted to assess school environment through a variety of instruments and approaches, ranging from inventories and rating scales to observational techniques. There seems to be a tendency toward increased emphasis on aspects of teacher behavior less directly related to instruction. Such factors as teacher morale and how teachers regard the quality of the instructional program seem to be of greater interest than teaching method. Rempel and Bentley's (1964) inventory of teacher morale contains 145 items comprising eight factors: rapport with principal, personal satisfaction, rapport with other teachers, salary, teaching load, relationship with community, school facilities, and teacher status.

The attitude of teachers toward children's behavior was studied by Tolor, Scarpetti, and Lane (1967), who found that teachers tended to regard as abnormal many forms of pupil behavior which psychologists considered normal. This phenomenon was less true with more experienced teachers.

A study by Davis and Slobodian (1967) compared first-grade children's perceptions of teacher-student interaction with data collected through a Reading Observational Record. The results of the study indicated that although children believed that teachers discriminated against boys and favored girls in reading instruction, analysis of observation of actual behavior revealed no differential treatment.

Studies by Rusch, Denny, and Ives (1965) and by Wodtke and Wallen (1965) examined the effect of teachers' instructional behavior on the development of pupil creativity. Teachers making a conscious effort to provide opportunities for creative thinking and expression and teachers exerting less control over classes were found generally to have a positive influence on creative development.

Kramer and Fleming (1966) studied the effects of interparental difference of opinion on children's achievement and found that parents whose opinions differed more had children with lower IQ's and reading achievement scores. These differences were significant for boys but not for girls. Hetherington (1965) examined the effects of the sex of the dominant parent on the sex-role preference of school age children. This study found that paternal dominance facilitated imitation and was related to increased father-daughter similarity. Maternal dominance disrupted the formation of masculine sex-role preferences in boys, as well as giving rise to low father-son similarity.

On the hypothesis that a child's adjustment is less related to actual parent behavior than to his perception of it, Schaefer (1965) developed a set of scales designed to collect children's reports. A 10-item scale was developed for each of 26 concepts.

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CHAPTER IV

Testing the Educational and Psychological Development of Adolescents – Ages 12-18

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Current published research at the secondary level has emphasized (a) aptitude and achievement testing, (b) the measurement of vocational interests and occupational preferences, and (c) the measurement of adolescent personality. Some research has been devoted to the affective domain of adolescents' behavior, and relatively little to the press of the school or nonschool environment, objective measurement of socioeconomic status, and inventorying of adolescent problems by the use of self-report instruments.

Aptitude and Achievement Testing

The interface between aptitude and achievement has been explored for basic elements primarily through factor analytic techniques. Other studies have investigated the predictive validity of measures of adolescent aptitude and achievement and the measurement of nonintellective variables associated with achievement. Longitudinal studies have been rather frequently reported.

Factor Analyses

Anderson and Leton (1964) studied the 1963 revision of the *California Test of Mental Maturity (CTMM)* and the short form of this instrument. Their data, which pertained to levels 3 and 4 of the instruments (grades 7-9 and 9-12), consistently identified three factors in the short form: Logical Reasoning, Numerical Reasoning, and Verbal/Memory. The long form was found to provide scales for five factors at all levels: Logical Reasoning, Numerical Reasoning, Spatial Relations, Memory, and Verbal Concepts.

In a study involving 26 variables (19 from Science Research Associates Form 4 of the *Selective Service College Qualification Test*, 6 from Form 1C of the *Army General Classification Test*, and sixth semester high school class rank), Wolins and Perloff (1965) derived guides for constructing test items to measure the factors of reading comprehension and ability to interpret graphic data.

The *General Aptitude Test Battery*

Weiner (1964) reported a cross-sectional, factor analytic study involving the 12 *General Aptitude Test Battery (GATB)* instruments, age, sex, and length of formal education and employing two samples for cross-validation purposes. There were approximately 500 subjects between the ages of 14 and 18 in each sample. Eight orthogonal factors accounted for 83 percent of the total variance: General Ability, Motor Speed, Spatial Perception, Sex, Age, Education, and two which were unnamed. Weiner concluded that general ability does not decrease with increasing age, a conclusion at variance with the widely held notion that general ability becomes differentiated into more specific abilities during the adolescent years and beyond.

From multiple regression analyses of data from Ohio secondary schools in which *GATB* aptitude scores were the predictor variables and point hour ratio and single subject grades at the end of one year were the criterion variables, Ingersoll and Peters (1966) found that, regardless of the aptitude and criterion studied, 50 percent or less of the variance of the criterion was associated with the *GATB* variables. The *GATB* was found useful as a predictor in both academic and vocational areas. In the academic area, Verbal, Numerical, Intelligence, and Clerical Perceptions were the best predictors.

Droege (1966) found in a longitudinal study of a national sample that *GATB* stability coefficients were highest in the eleventh grade and lowest in the ninth grade. Retest mean scores were progressively higher. Sex differences favored girls in Form Perception, Clerical Perception, Motor Coordination, and Finger Dexterity. Aptitudes with the highest stability coefficients were Intelligence, Verbal Aptitude, and Numerical Aptitude, while those with the lowest were Form Perception and Finger Dexterity. The stability findings may throw some light on Weiner's conclusion concerning the "differentiation hypothesis." It is possible that what appears to be lack of differentiation of general mental ability during adolescence is an artifact of the data collection instrument.

Longitudinal Studies

In a study of relationships between scores obtained in ninth grade on the *SRA Test of Educational Ability (TEA)* and grade point averages at the end of tenth grade, Blumenfeld (1965) found that total *TEA* and *TEA* Language scores best predicted the criterion over the 13-month period. The most comprehensive study of cognitive growth during high school made during the past three years was reported by Shaycoft (1967) as part of Project Talent. She concluded that growth in cognitive skills between grades 9 and 12 is substantial both in raw scores and in relation to group variability. The largest gains were in vocabulary. For the component information scales, correlations between ninth- and twelfth-grade scores on the same test, corrected for attenuation, tended to be highly significant, particularly in those areas which are not generally parts of the regular high school curriculum. The amount of information a ninth-grade student has the interest and ability to acquire and retain is an excellent predictor of what his attainment in the same cognitive area will be by the time he reaches twelfth grade.

Shaycoft identified sex differences in patterns of mental growth between grades 9 and 12. On most of the tests, the sex which exhibited the larger raw score gain also had the higher initial score. Reading Comprehension scores appeared to be enhanced by such college preparatory courses as mathematics, science, and foreign language. The 95 variables studied by Shaycoft produced a factorial structure characterized by a general factor, Verbal Intelligence, and 40 common factors for each sex, 35 of which were approximately the same for the two sexes. The most important common factors extracted were Mathematical Ability, Spatial, English, and Technical Information. The general factor accounted for a larger proportion of the ninth-grade variance than of the twelfth-grade variance, a finding which supports the notion of differentiation of special abilities out of the general factor during adolescence. One of the most significant inferences to be drawn from Shaycoft's data is that it is impossible to make a fundamental distinction between aptitude and achievement tests. All the measurable abilities within the Project Talent battery were modifiable to some degree by the forces which impinged on students while they were in high school.

Predictive Validity

Milholland and Womer (1965) concluded that the only advice they could give a high school student who had taken the *Differential Aptitude Test (DAT)* and was bound for the University of Michigan is that one stands a better chance of graduating, regardless of his university field of specialization, if his Verbal Reasoning, Number Ability, Abstract Reasoning, and Spatial Relations scores were high. Mechanical Reasoning, Clerical Speed and Accuracy, Spelling, and Sentence scores were not predictive.

As part of a larger study, Conry and Plant (1965) determined that the *Wechsler Adult Intelligence Scale (WAIS)* vocabulary score was as efficient a predictor of rank in high school graduating class as any composite *WAIS* measure; however, neither the *WAIS* vocabulary score nor the *WAIS* Verbal IQ was a better predictor of the criterion than composite scores on the *Terman-McNemar Test of Mental Ability* and the *Chicago Test of Primary Mental Abilities.*

Data from the administration of the *DAT*, the *CTMM*, the *Cooperative School and College Ability Tests (SCAT)*, and the *Sequential Tests of Educational Progress (STEP)* to Negro secondary school students in a Texas city, analyzed by Boney (1966), consistently yielded substantial multiple correlations with high school grade point average. He inferred from this that Negro high school students are as predictable as other groups from their measured developed abilities.

Nonintellective Variables and Achievement

Zoolalian (1965) found that ninth-grade boys who scored in the top 25 percent on the *Seattle Algebra Test* had more positive self-concepts as measured by the *Minnesota Counseling Inventory (MCI)* than students who scored below the mean. The more successful algebra students were more emotionally stable, had better family and social relations, were better adjusted to reality, and exercised more leadership. Spaights (1965) ascertained that bright junior high school students tended to rate themselves less accurately than their less able classmates because they underestimated their achievement.

The Relationships Among Achievement, Creativity, and Divergent Thinking

Edwards and Tyler (1965) reported two experiments, one comparable to the original 1962 study of Getzels and Jackson and the other based on Torrance's threshold concept, which hypothesizes that above a critical IQ level of 115-120, differences in creativity may be more positively related to differences in achievement than at lower IQ levels. All ninth-graders in North Bend, Oregon, were administered the *SCAT*, the *STEP*, and two subtests of the *Minnesota Tests of Creativity*. Students in the highest third of the *SCAT* distribution but not this high on the creativity measures (Group 1) were compared with those in the highest third on creativity scores but not on the *SCAT* distribution (Group 2) and with those in the top third on both counts (Group 3). Comparison of Groups 1 and 2 showed that excellence on the creativity tests was not related to school achievement but that *SCAT* performance was, a finding in conflict with those of Getzels and Jackson and of Torrance. In the comparison of Groups 1 and 3, subjects with ability scores above the IQ threshold hypothesized by Torrance and also in the highest third of the creativity distribution averaged significantly lower on school grade point average than did their less creative peers. Edwards and Tyler suggest that their results may be due to the unselective nature of their sample.

Herr, Moore, and Hansen (1965) found no relationship between the Guilford *Tests of Creativity* and several tests of intellectual ability. The *AC Test of Creative Ability* yielded correlations of 0.54 with the *Lorge-Thorndike Intelligence Tests* and 0.53 with *Watson-Glaser Critical Thinking Appraisal* scores. Scientifically oriented bright students tended not to give priorities to social values as measured by the Allport-Vernon-Lindzey *Study of Values*. Feldhusen, Denny, and Condon (1965) studied correlations among general anxiety, *SCAT*, *STEP*, a creativity self-rating scale, and divergent thinking tests of originality, flexibility, and ideational fluency of seventh- and eighth-grade pupils. High anxiety subjects were lower than low anxiety subjects on *SCAT* and *STEP*, but the two groups were not significantly different in divergent thinking. Positive relationships were found for males between *SCAT* and creativity self-ratings and for all subjects between *SCAT* and *STEP* and flexibility but not ideational fluency.

Measurement of Vocational Interests and Occupational Preferences

Factors Associated with Vocational Interest and Occupational Choices

Thompson (1966) confirmed Super's hypothesis that ninth-grade students are in the vocational exploration stage from data obtained by administering an occupational value scale and a personal information survey to 2,287 ninth-graders in 10 California high schools, and a year later to 1,790 of the original sample. Characteristics judged important by over 80 percent of Thompson's subjects were an interesting job, opportunities for self-expression, security of position, and opportunities to help others. Virtually no differences were found between the occupational values of ninth- and tenth-grade students. Thompson also found that subjects whose fathers had high prestige vocational identifications placed significantly more importance on a job where one could exercise leadership. Those students who were interested in gaining power through their vocations tended to be from rural areas and to be the recipients of relatively low school grades. Job security and high pay were more important to students whose fathers were in low prestige occupations.

Perrone (1964) found that boys with similar scores on cognitive measures tend to prefer similar occupational groups. Girls who have high verbal intelligence have a preference for occupations within the general cultural area which includes teaching.

Chansky (1965) found certain differences between the vocational interests of ninth-grade white and Negro students matched on Segal and Raskin's *Multiple Aptitude Tests*. The Negro students were interested in occupations in which interpersonal relations are important and for which the training required is lengthy. Negroes also preferred verbally oriented occupations and work involving arithmetic manipulations. The white students exhibited greater interest in machines and their operation than did Negroes. No differences were found in scientific interests.

Occupational values and aspirations associated with conforming to depressed family and community life were found by Stevic and Uhlig (1967) to characterize the responses of a group of high school students in southeastern Kentucky to the Miller and Haller Occupational Aspiration Scale and to a question designed to identify role models. The students preferred the work of a filling-station attendant to that of a Supreme Court Justice and the work of a farmhand to that of a county judge. The genesis of such affective behavior is at least as important as its existence.

Validity of Measures of Vocational Interests

McCall and Moore (1965) administered the *Kuder Preference Record (KPR)* to boys and girls early in the ninth grade. In the following spring the students were asked to estimate their relative abilities to perform the same activities while ignoring their interests in them. McCall and Moore concluded that about one third of an individual's *KPR* interest score can be explained by an "estimated ability" set. This set is stronger for girls than for boys and stronger for more able students. That the interface of interests and abilities blends into commonality when ninth-grade students respond to items on an interest inventory is a truly significant finding.

Barnette and McCall (1964) suggested that before the *Minnesota Vocational Interest Inventory* can be used with greater validity with vocational high school boys in both grades 9 and 12, a simpler vocabulary must be substituted for the present one and a shorter form of the instrument developed for use in the ninth grade. Berdie (1965) concluded that university graduates in dentistry, mechanical engineering, architecture, and journalism had, as high school seniors, tended to obtain *Strong Vocational Interest Blank* scores related both statistically and practically to their subsequent professions.

From interviews conducted with eighth-grade boys and girls and again in the tenth grade, Gribbons and Lohnes (1965) scaled eight dimensions of *Readiness for Vocational Planning (RVP)*. A twelfth-grade follow-up interview was also used to scale a number of career criterion variables. Multivariate analyses of variance established the dependence of many of the criteria on the *RVP* score sets. The major finding was that eighth-grade *RVP* scores had much the same qualities and levels of validity as did tenth-grade *RVP* scores, which suggests that some aspects of vocational self-concepts develop at an earlier age than was generally thought. It should be noted that the *RVP* scales had little predictive validity for specific occupational preferences. Occupational group and level, however, can be predicted. Family socioeconomic level, father's educational level, and the socioeconomic accessibility of occupational preferences were nonpredictable from the *RVP* scales.

Changes in Occupational Decisions

Using the same protocols, Gribbons (1964) found that tenth-grade students were more aware of their interests and values and the relationship between these kinds of affective behavior and occupational decisions than they were two years earlier. They were also more willing to take responsibility for their decisions. On the other hand, many eighth-graders were more ready to make effective vocational decisions than were tenth-grade students. This finding leads to the important inference that curriculum and vocational choices should not be delayed arbitrarily beyond the eighth grade but should be related to individual differences in readiness for vocational planning. By use of the *Geist Picture Interest Inventory,* Montesano and Geist (1964) found that in occupational decision making high school senior boys tended to use interests less and abilities more and to cite occupational variables more frequently than did ninth-grade boys.

Measurement of Personality

Springob and Struening (1964), using junior and senior high school boys as subjects, applied factor analysis to develop five factor scales which accounted for the major proportion of the reliable variance of the 18 scales of the *California Psychological Inventory (CPI)* when scored by Gough's procedure, and which may be denominated as Self-Control, Self-Acceptance and Outgoingness, Flexibility, Modal Response, and Masculine-Feminine Interests. The Springob and Struening study supported Thorndike's notion that the *CPI* scales contain considerable redundant variance.

Gough (1964) developed a regression equation for high school grade point average from *CPI* scores obtained by 1,384 students from five American secondary schools and by 341 students enrolled in several Italian *licei.* A cross-validation coefficient of 0.56 was obtained for the American students and one of 0.39 for the Italian students. A mental ability measure raised the first correlation to 0.68 but lowered the latter to 0.33. It appears from these data that achievement of the individual high school student in Gough's American sample was related not only to the student's developed academic ability, but also to his sensitivity and acceptance of the core values of the American social order.

French (1964) used 15 aptitude factors, 7 information variables from subject matter not generally taught in school but which might be learned indirectly through reading and hobbies, and 10 personality variables selected from Saunders' *Personality Research Inventory* to predict differentially and absolutely grades in various high school fields of study. He concluded that the pure factor test battery was only minimally useful for differential prediction. French's findings suggest that only interest preference measures, which he did not use, are highly satisfactory for differential prediction.

Kemp and Kohler (1965) found the Rokeach Dogmatism Scale, although standardized for use with adults, to be suitable for administration to high school students to identify adolescents who are particularly intolerant of ambiguity, who reject novel ideas, and who are likely to benefit from therapeutic counseling.

Lohnes (1966) factor-analyzed the Project Talent data to provide a theory of the structure of adolescent personality. He analyzed the intercorrelations among 60 "surface" traits and emerged with 13 uncorrelated "source" traits which accounted for 65 percent of the variance. The most important factor was Verbal Knowledge, which accounted for more of the common variance than did English Language, Visual Reasoning, and Mathematics combined. Lohnes considered this Verbal Knowledge factor to be the closest approximation to General Intelligence or Spearman's *g* within the Project Talent data. He also identified two triadal subsets which he considered to be the most important independent dimensions of adolescent intellectual ability, identified as "differential aptitudes" and "core educational achievements." Visual Reasoning, Perceptual Speed and Accuracy, and Memory comprised "differential aptitudes," and English Language, Mathematics, and Verbal Knowledge made up the second triad. According to Lohnes, these two triads provide the most essential data about the intellectual development of individual students.

Lohnes also derived 13 factors from 38 "Motive Domain" variables. These 13 factors, which included grade and sex, accounted for 71.5 percent of the variance in that domain. When grade and sex were eliminated as "source" traits from the factor analyses of adolescent abilities and motive domain variables, the remaining 22 "source" traits constituted the hypothetical constructs in Lohnes' trait-factor theory of adolescent personality. Since he found only moderate redundancy of factors in the motive and ability domains, he concluded that the two domains were relatively autonomous systems. Differences in "source" traits were found to favor boys in Visual Reasoning, Verbal Knowledge, and Mathematics. Girls excelled in Perceptual Speed and Accuracy, in Memory, and in English Language.

In a questionnaire survey of about 9,000 tenth- and twelfth-grade students in 59 of the Project Talent high schools, Neulinger (1966) found substantial positive attitudes toward tests but an even more substantial opposition to their use. Attitudes toward mental ability tests were dichotomized by social class. Middle or upper class students who came from well educated families and who had internalized the achievement ethic were likely to be pro-test. The lower class student, however, was prone to be antitest. The lower class student assumed, very likely, that tests are another means the school uses to demean and degrade him, while the higher status student believed generally that test data validate his placement in the school's intellectual and social elite. The great majority of all respondents objected to the use of tests as bases for marriage and for the right to vote.

Measurement of the Affective Domain

Jones, Gottfried, and Owens (1966) reported that adolescents in grades 9 to 12 and ranging in age from 14 to 19 years tended to accept or reject exceptional persons in terms of specific attributes rather than on the basis of absolute or general considerations.

Longstreth and Rice (1964) used 20 pictured filial situations to study the perceptions of adolescent boys concerning parental love and control and 13 two-choice sentence completions to assess the degree to which these boys identified with parents rather than peers. Aggressive, acting-out boys perceived their parents as significantly lower in love than did well adjusted boys, with nonaggressive, underachieving boys in between. The aggressive, acting-out boys described themselves as more identified with peers than with parents, while the well adjusted subjects identified more with parents, with the nonaggressive, underachieving boys again in an intermediate position. A reliable, positive correlation was found between boys' descriptions of their parents as high in both love and control and self-perceptions as highly identified with parents.

In a study designed to ascertain differences in three areas of affect manifested by ninth-grade students matched on *California* group IQ's of 120 and above but differing in school achievement, Ringness (1965) reported that less successful, bright ninth-graders tended to describe themselves as less interested in academic achievement than their academically more successful peers but did not perceive themselves as less conforming to social standards or less interested in affiliation with others than did the more academically successful. It appears that bright high school freshmen who receive higher grades may adhere to different values.

By the use of a discriminant analysis of the Allport-Vernon-Lindzey *Study of Values* (Levy modification), Sprinthall (1964) found differences in the value patterns of underachievers, poor achievers, superior achievers, and high school teachers. The major element of differentiation was the Economic Value. Teachers and superior achievers had the most similar pattern of values, while poor achievers and underachievers also tended to show similarities in the value domain. On the Economic Value scale, highest scores were obtained by the underachievers, followed by the poor achievers. The lowest Economic Values were indicated by teachers, the next lowest by superior achievers. It may be that high school teachers tend to give higher grades to those students whose value patterns are more closely allied to their own.

In one of the few reported studies to make use of projective techniques, Caldwell and Matoon (1966) carried out a 2 x 2 chi-square analysis of race differences on a somato-chroma apperception test in which subjects were asked to choose from eight progressively darker pictures that which he was most nearly like and that which showed the skin color he would like to have. The Negroes who wanted to change skin color wanted to be lighter. Whites who desired to change wanted to be darker. Serious questions can be raised concerning the comparability and size of the samples.

Measurement of Environmental Influences

Through data obtained from the administration of the *High School Characteristics Index* to 725 students in a northern New Jersey high school, Herr (1965) concluded that the press upon secondary school students from faculty and administration and from the peer group is disparate and incongruent. Differences in intensity of perceived press were found to distinguish high achievers from low achievers. Among the press factors perceived by high achievers with greater intensity were affiliation, objectivity, and problem-solving behavior. Press perceived by low achievers was characterized by self-depreciation, withdrawal, egocentrism, and obsessive-compulsiveness.

Clements and Oelke (1967) studied problems reported by 720 adolescents enrolled in public secondary schools in Georgia who responded to the *Mooney Problem Check List*. Students enrolled in counties characterized by increasing population mobility reported the largest mean number of problem areas. Boys indicated more problems with their vocational and educational futures, while girls reported more problems with health, physical development, courtship, sex, and marriage. Adjustment to schoolwork was reported most frequently as a problem area in the tenth grade.

McDonald (1964) reported the atypical finding that socioeconomic status was not a significant factor in the academic achievement manifested by 4,200 eleventh-grade Michigan high school students, particularly among those who were underachievers. The most important implication of McDonald's data is that a given high school student may have more in common with those whom he aspires to emulate than with those with whom he is presently identified.

Coleman and others (1966) assessed vocabulary, nonverbal ability, reading comprehension, mathematics achievement, and general information across racial and ethnic lines by using a test battery comprised of items from published tests, some of which were in current use in the schools. Motivation for future achievement was studied by questionnaire. In grade 12, the average scores obtained by white students in all regions were above those of all other groups except Orientals who, in certain regions, had higher mean scores in mathematics and nonverbal ability. Racial and ethnic groups, in general, on all tests ranked in the following order: white students, Orientals, Indians, Mexican-Americans, Puerto Ricans, and Negroes. Averages for Negro students tended to be about one standard deviation below white students in grade 12. In general, achievement was found to be consistently lowest in the nonmetropolitan South and highest in the metropolitan North. Greater regional variation in achievement was found for Negro than for white students. The longer Negroes stayed in school, the greater their relative deficit became in general school achievement, especially in the South and Southwest nonmetropolitan areas. Intermediate deficits were found in Southwestern and Southern metropolitan areas and in Northern and Western nonmetropolitan areas. Little or no decline was found in Northeastern, Midwestern, and Western metropolitan areas.

The Coleman study indicated that Negro students do not differ significantly from white students in motivation for school attendance and success. Negroes were found to have high hopes for going to college but fewer concrete plans for college attendance. Both groups tended to have somewhat unrealistic occupational aspirations, since 35 percent of the twelfth-grade students reported that they planned to enter a profession, but only 13 percent of the total labor force in the United States was currently employed in the professions. Negroes had self-concepts as positive as those held by white students according to the Coleman data, but Negroes and other minority groups indicated less feeling that they can control their environments and thus become the architects of their own destiny.

It can be generalized from the Coleman study that educational disadvantage in the United States is greatest for Negroes and Puerto Ricans and least for Orientals. The paramount importance of family background as the source of factors associated with achievement during the school years was emphasized. The social composition of the student body was more highly related to achievement than were school facilities, curriculum, or staff. If the schools are to become, in fact, effective mechanisms for mobility through the provision of equality of educational opportunity, they must have strong, pervasive, cumulative impacts on students which are independent of their families, neighborhoods, and peer environments. The Coleman study indicated that, up to the present time, schools in the United States have not had such influences on minority group students.

Conclusion

Researchers, in general, have brought considerable sophistication and technical competence to their task of measuring adolescent behavior. It is apparent, however, that the emphasis upon trait-factor theories derived from factor analytic techniques has given relatively little concern to the individual adolescent who is functioning in a particular subculture within the general American culture. It is not too much to hope—in fact, to suggest—that a desirable direction of future research in this area might entail placing greater emphasis on the idiographic and the holistic considerations of adolescence.

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CHAPTER V

Testing the Educational and Psychological Development of Young Adults–Ages 18-25

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At present, there are about 19 million young adults living in the United States. According to the Bureau of the Census, somewhat less than half (46 percent) are enrolled in school, ranging from elementary to university. Since about two thirds of them are employed, a considerable number are combining work with education. Among those in the 20-24 age range, 80 percent are employed, and only 19 percent are still in a school setting. Thus a large proportion of this age group is not involved in formal education, although the important college population is largely composed of 18–25-year-old students.

The lives of these young adults are marked by fluidity and shift—change of job, change of goals, change of college. It is such developmental discontinuities rather than smooth maturational processes which give rise to much of the interest in research and testing at this age level. Aside from Loevinger's (1966) significant work on the construct of ego development, there are no general theories of development at this age level comparable to the work of Piaget, Erikson, or Bruner at younger ages. There is, however, considerable theoretical and practical interest in three types of change closely associated with important points of transition: (a) cognitive educational development, (b) changes in attitudes and values associated with college attendance, and (c) vocational choice and career development. A fourth line of relevant research interest deals with the college as an agent of change.

These four areas constitute the focus of this review. The heavy emphasis on college students at the expense of educational developments in other contexts is partly a reflection of the formal literature but also the decision of the authors in the face of space and reference limitations. Since the "testing" problems of this age group require a broad interpretation of the term, the emphasis here is upon "measurement" or any systematic effort to quantify behavior of young adults in order to arrive at generalizable findings.

Cognitive Educational Development

There are two broad interests in appraising cognitive educational development: accreditation and prediction. Each has its variants, but the former refers generally to a formal basis for recognizing achievement; the latter, to a method of optimizing differential treatment. Parts of both ideas are often discussed under the broad heading of "placement."

Accreditation of achievement in college and elsewhere has usually been a local matter. There have been significant attempts to order educational objectives within the cognitive and affective realms (Krathwohl, Bloom, and Masia, 1964). By and large, however, colleges and their professors have zealously guarded their right to appraise educational outcomes.

There are two trends which may have an impact on the appraisal of achievement. Student disenchantment with grading systems has already encouraged some colleges to introduce modifications, and new institutions are experimenting with a variety of new methods of assessment. Secondly, the exploding diversification of post-secondary education is creating new problems of academic currency. The College Entrance Examination Board's College-Level Examination Program is a potentially useful activity designed to meet the accreditation needs of students who are affiliated with formal institutions.

Hills (in manuscript) offers some clear precepts regarding the testing of educational development as it relates to placement for differential treatment. In a lucid and instructive paper he has elaborated Cronbach and Gleser's (1965) decision theory as a system for fostering and evaluating the development of students and institutions. Too often placement has been conceived as a rigid scheme for the assignment of students to fixed slots. Hills rightly contends that placement should be based on careful analysis of traits and methods in order to predict which educational treatments are differentially effective with which students. Identification of useful variables is critical, and Hills gives some examples from the work of Krumboltz and Yabroff (1965) and Snow, Tiffin, and Seibert (1965). These authors experimented with such variables as previous training, aptitudes, cognitive styles, attitudes, which, when combined, would have different regression slopes for different instructional procedures. In some instances these efforts met with moderate success.

Most colleges settle for correlations between test scores and course grades as evidence of placement test validity. Hills (in manuscript), Gagné (1967), and others have pointed out, however, that a basic ability measure should correlate with a valid achievement measure after a learning program including differential treatment only to the extent that the program is *ineffective* in leading from one level of learning to the next. Since the familiar power test of achievement is heavily loaded with aptitude factors, it seems highly questionable that a simple correlational model is adequate for placement problems. In bare form, this line of reasoning constitutes a strong case for preferring a decision theory model for assessing differential treatment. It will be recognized that the same considerations apply to the validation of tests designed to accredit prior work. In that instance the rationale must rest largely on content validity.

Vocational Choice and Career Development

Research on vocational choice has been explicitly tied to ideas of development through life stages. In the United States the origin of this work is traced to Ginzberg and his associates, who in 1951 criticized vocational guidance for its lack of theory. The response to Ginzberg's challenge has been closely associated with Super's Career Pattern Studies at Columbia and Roe and Tiedeman's studies of career development at Harvard. Crites (1965) has described substantial research activities in vocational development at Iowa.

In a recent amplification of an important aspect of his theoretical work, Super (1964) emphasized the exploratory nature of career choosing in its early phases and the need of the individual to relate his own values to career possibilities. Pallone and Hosinski (1967) provided an example of a study based on Super's conceptual model in which they suggested that vocational choice for nurses is a process of choosing an occupational role consistent with an ideal self.

The work of Tiedeman (1967) and his associates on a computer-based information system for vocational decisions is of particular interest since, through modern technology, it will supplement traditional psychometric approaches to vocational guidance by enabling the student to relate knowledge about himself to data about education, training, and work.

Project Scope at the University of California (Tillery, 1966) represents another recognition of the need to dig deeply into the longitudinal bases of educational and career decisions. The four-state study began at the ninth grade and emphasized the evolution of aspirations and plans. Holland's work (Holland and Nichols, 1964) represents an additional recent model of decision making as it relates to six types of personal orientations.

Project Talent certainly represents the most ambitious effort to develop a national baseline of normative information regarding career development. It has already generated some 25 project publications and 40 published articles, although much of the work to date focuses on an earlier age level than this report. The one-year follow-up studies after high school are primarily concerned with career development—plans, educational decisions, nature of employment, and satisfaction (Flanagan and Cooley, 1966).

These data already indicate that a high degree of instability exists in the plans of young adults. Project Talent hopes to aid students in the career choice process by developing a school computer measurement system of guidance in which there is regular feedback of analyzed information to students, teachers, and administrators to provide a basis for periodic review and updating of the students' educational plans and decisions. To construct such a system, Project Talent hopes to produce a coherent trait-and-factor theory of adolescent personality, delineate the measurement system related to that theory, and establish predictive validities for the measurement system against career and life adjustment criteria. Recent work by Weiner (1964) supports one underlying assumption of such a system in indicating the possibility of a reasonably stable structure of intellect from age 15 through middle age.

Project Talent results indicate that neither ability nor motivational measures are better predictors than merely asking a ninth-grader what he wants to be after high school (Flanagan and Cooley, 1966). But the value of a probability prediction model resides in the information it will provide to students—particularly those who eventually adopt career plans. The development of such systems will be watched with interest. In the meantime, work along traditional fronts proceeds apace. As a notable example, the *Strong Vocational Interest Blank* has undergone major revision during the period under review. In addition, Campbell (1966) has written an illuminating review of Strong's work on the test and has demonstrated substantial stability of the scores over long periods of time.

Changes in Attitudes and Values

In a provocative book, Bloom (1964) maintained that much of the development of individual characteristics takes place at a very young age. He reported, for example, that by the age of two at least one third of the variance in the intellectual interest, dependency, and aggression of adolescents is predictable. Bloom regarded it as surprising, however, that on self-report instruments more change appears to take place in the first two years of college than at any time during the next 10 to 20 years of an individual's life. This observation is quite consistent, though, with Tiedeman's notion (1964) of the individual searching for himself at times of maturational discontinuity.

Empirical evidence spotlights the move from school to college as an important discontinuity accompanied by significant changes in attitudes, values, and interests. Typical findings are that college students become more liberal, more tolerant of individual differences, less conforming, and more free to express impulses (Dressel and Lehmann, 1965; Freedman, 1967). Other evidence indicates that students become more aware of their shortcomings, more specific in their motives, and less dependent on external standards of behavior (Nichols, 1967).

Plant and Minium (1967) examined data from five longitudinal studies and, noting that changes are more likely to occur among high ability students than among low ability students, questioned whether the college experience is necessarily a liberalizing one. This line of reasoning does not take fully into account, however, the fact that many changes occur quite quickly after the student reaches the campus. Wallace (1965) found that after only a few months, freshmen on one campus had taken on the prevailing aspiration toward graduate study. Sanford (1967) has also noted that change develops rapidly and levels off during the last two years of college. In fact, there is indication that stability in attitudes exists to a disturbing degree after college graduation, particularly in the case of women.

The College as an Agent of Change

It is now generally accepted that an understanding of the development of young adults must be based, in part, on an understanding of the major agents of change. One of the most stimulating lines of educational research in recent years has dealt with the character and differential effect of colleges, but this work is too extensive to allow more than brief mention of some major trends.

A wide variety of methods have been used to describe colleges. Trow's typology of college cultures (collegiate, vocational, academic, and nonconformist) is of sociological origin. Psychometric measures such as Stern's *College Characteristics Index* and Pace's *College and University Environment Scales* trade on collective student judgments. More statistically oriented researchers have utilized sets of readily available indexes which seem to account for most of the important differences among colleges. An example would be Astin and Holland's Environmental Assessment Technique.

Several research centers have set the differential effects of higher education as a major goal in their research programs. A recent important report in this area from the Center for Research and Development in Higher Education in Berkeley is Heist's *Education for Creativity* (1967). For the past decade the National Merit Scholarship Corporation (NMSC) has continued an intensive investigation of college effects. A major report by Nichols (1967) summarized personality changes associated with different types of colleges. Astin has carried the NMSC tradition to the American Council on Education, which has initiated a long-range research program using student input data and longitudinal criteria from a large sample of colleges. Study of the differential impact of colleges is one of the primary goals of this program (Astin and Panos, 1966).

Newcomb and Wilson (1966) have brought together an important collection of papers presenting the sociological view of peer group influence. Since there is recent direct evidence that the classroom environment varies with student input (Astin, 1965), the difficult problem of disentangling peer influence and college effects is thereby dramatized. Along similar lines Stanley (1967) has emphasized the necessity of separating individual effects from college effects and suggested an interesting methodology for doing so.

Continuing Problems

Much of the best work of the past few years has served to dramatize the importance of previously recognized problems. There is, for example, a continuing paucity of good research data on effective use of achievement tests for college placement and guidance. A more serious and complicated problem is the need for operational placement and accreditation models for systems of higher education. As institutions diversify and as public systems assume proportionately greater control of higher education, there is heightened need for equitable bases for assessing educational development and defining academic standards. In addition, the diverse purposes of individual institutions must be related more precisely to admissions policy and subsequent evaluation of educational development. The work of Richards, Holland, and Lutz (1966) represents a useful first step in exploring the relationships between academic and nonacademic accomplishment. A further useful development would be to broaden current characterizations of colleges to include institutional purposes or roles.

There is every reason to expect that work in career development will proceed in step with work in guidance. There is insufficient evidence, however, that these lines of work are satisfactorily coordinated in theory or practice with the educational process. While business leaders wonder why college grades are not related to subsequent success and students complain of the irrelevance of college work, educators must seek to integrate educational programs and objectives with career development and the guidance process. The responsibility for describing the personal implications of educational and career opportunities will fall, in considerable part, on measurement specialists and related professional groups. As indicated in this review, such systems are now in their first stage of development.

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CHAPTER VI

Testing in Professional Education

CHRISTINE H. McGUIRE*

As noted in the October 1965 REVIEW OF EDUCATIONAL RESEARCH on Higher Education, any attempt to summarize research at the level of professional education is an arduous task because of the quantity of material available and the diversity of sources and interests represented. Such problems are particularly acute in reviewing research on testing, since much of the literature in this field represents applied research *with* tests designed to solve urgent practical problems rather than basic research *on* tests, and consists of descriptive reports of the results of individual school testing programs, from which it is especially hazardous to generalize.

This literature suggests that problems related to the measurement of educational input and educational product at the professional school level are quantitatively, perhaps even qualitatively, different from the analogous problems confronting educators concerned with the education of children and adolescents: first, because of the almost obsessive preoccupation with finding tests that can be used reliably to select the best students from a large pool of highly qualified applicants; and second, because of the obvious social responsibility (exacerbated by requirements for state licensure and specialty board certification in some professions) of certifying that the graduate of a professional school is indeed qualified to discharge his functions competently. However, current literature about adult and professional education reveals little evidence of interest in diagnostic testing for purposes of assessing student needs and guiding student learning.

Research on Measures of Educational Input

Aptitude and Achievement Testing in Student Selection

For the most part, studies of the predictive validity of aptitude and achievement tests commonly required of applicants to professional schools have followed the same basic design: test and subtest scores (the predictor variables) for the total population in a single school or class are correlated with cumulative grade point average (GPA), year-by-year GPA, GPA on various clusters of courses, and, where relevant, national or state board licensure examinations (the criterion variables). In general, the reported correlations are zero order magnitude or, if statistically significant, are so low as to lead to the interpretation that they are of little practical significance.

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For example, Stricker and Huber (1967) found that for a group of students in psychology ($N = 37$) the undergraduate GPA in psychology courses was the single best predictor of success and that the most useful of the *Graduate Record Examination* scores (the sum of the quantitative aptitude and psychology achievement test scores) made only a slight contribution to the prediction of grades and an entirely negligible contribution to the prediction of length of time required to arrive at the oral examination. Similarly, Hebert (1967) found that the undergraduate cumulative GPA and GPA in education courses were better predictors of success in graduate education courses than were scores on the relevant *Graduate Record Examination (GRE)*, the *Miller Analogies Test (MAT)*, or the *National Teacher Examinations.* Not surprisingly Payne and Tuttle (1966) found the *MAT* to be substantially more efficient in predicting comprehensive examination scores ($r = 0.51$) than in predicting the course grades ($r = 0.26$) of 219 candidates in a master's degree program in a graduate school of education. These and related studies in graduate education are best summarized by Madaus and Walsh (1965) who in an investigation of departmental differentials in the predictive validity of the aptitude components of the *GRE* concluded that scores on these tests are inefficient predictors of success in graduate school studies and that the regression analysis model does not produce useful data to guide decision and selection among applicants to graduate schools.

Such results are consistent with those obtaining for corresponding tests used for selection purposes in professional schools. For example, Lewis, Braskamp, and Statler (1964) found a statistically (though not practically) significant correlation ($r = 0.39$) between the *Law School Admission Test* and first semester achievement in a law school but reported that the validity of the test for predicting subsequent achievement was substantially less. Lewis (1964) reported analogous results for the *Admission Test for Graduate Study in Business*—only the quantitative subscore significantly correlated with persistence in a master's program in business administration. Similarly, in a study of 116 male engineering students Boe (1964) reported that correlations between scores on the A.C.E. *Psychological Examination* and cumulative GPA and GPA in engineering courses were not statistically significant. In a study of the predictive validity of the *National League for Nursing Pre-Nursing and Guidance Examination (PNLN)*, Madaus (1966) reported that the verbal, quantitative, and total scores on the *PNLN* had no predictive validity for any of the following criteria: individual course grades, relevant achievement tests of the Psychological Corporation or licensure and state board examinations in nursing, and none of the *PNLN* scores was useful in predicting clinical performance. Finally, Roemer (1965), in a nine-year study of over 800 students in one university, concluded that neither the *Medical College Admissions Test*

(MCAT) nor the premedical GPA correlated sufficiently with any relevant criterion measure to be useful.

These generally discouraging results are partially explained by the fact that although assessment of practical performance (e.g., of prospective teachers in the classroom; of prospective nurses, doctors, and dentists in the clinic or ward, etc.) enters so heavily into some of the criterion variables, it is rarely assayed in conventional aptitude and achievement tests used for selection purposes. For this reason studies of the predictive validity of the manual aptitude tests included in the *Dental Aptitude Test (DAT)* may be of special significance. Of particular interest in this battery is the chalk-carving test in which the subject is directed to produce two carvings to specifications defined by cross-sectional drawings. In the most comprehensive interschool study ($N = 500$) of the predictive validity of the entire *DAT* battery, Ginley (1966) reported that scores on reading comprehension and the combined tests of academic aptitude constituted the best predictors of grades in theory courses in dentistry; that scores on the chalk-carving test and the combined tests of manual aptitude were the best predictors of grades in technique courses; and, finally, that for the total 1963 candidate population ($N = 3{,}173$), scores on reading comprehension, science achievement, and the combined academic aptitude tests were the best predictors of performance on the *National Board* (licensure) *Examination* (in dentistry); however, these correlations were generally in the range of 0.20 to 0.30, and none exceeded 0.40.

It also has been noted that even with a highly reliable criterion measure the restriction of range in either the predictor or criterion variables inevitably produced by the selection process itself may account, in part, for the low correlations generally reported between aptitude test scores and measures of success in graduate or professional studies. This view seems to be supported by the two extensive ($N = 2{,}000$ and $4{,}000$) interschool studies (Sedlacek and Hutchins, 1966) of the correlation between scores on the *MCAT* and on the *National Board* (licensure) *Examination* (in medicine), from which the authors concluded that the regression coefficient can be affected by a restriction of range in the criterion and that low variability in performance on the criterion "could preclude the possibility of finding *anything* that would predict the criterion scores with *any* accuracy" (reviewer's italics).

These studies suggest that a more sophisticated approach to the incorporation of both test and performance data in selection decisions is required. One such approach is represented by the experimental model for computer assistance in decision making developed by Hunka, Gilbert, and Cameron (1966). These authors found, contrary to American studies, that scores on the *MCAT* did add substantially to the validity of their predictions regarding medical school achievement. Combining all accumulated school data on success and failure the authors wrote a computer program which calculated an expectancy table for predicting first-year grades in medical school. Regression equations derived from data on the initial sample were cross-validated on a second student sample for which the program calculated each student's predicted GPA and printed out the advice to accept or reject him. The authors reported an impressive 0.89 coefficient of correlation between the criterion and predicted scores and a sufficiently positive evaluation of the accept-reject decisions based on an elementary decision theory approach to suggest the importance of continuing this line of investigation for more effective utilization of aptitude and achievement test data in selection procedures.

Attitude, Interest, and Personality Testing in Student Selection

Because tests of cognitive attributes have yielded such generally disappointing results, there is a growing tendency to incorporate various interest, attitude, and personality measures in the admission test batteries of certain professional schools. Some support for this approach is to be found in a series of studies done at the University of Minnesota Medical School by Schofield and Merwin (1966), who found that the optimal weightings of premedical GPA and *MCAT* score differed significantly between that group of applicants considered to be favorable prospects in terms of both personality, as measured by the *Minnesota Multiphasic Personality Inventory (MMPI)*, and vocational interest, as measured by the *Strong Vocational Interest Blank (SVIB)*, and that group whose measured values on either of the latter instruments appeared to be questionable. Gough and Hall (1964), utilizing the *California Psychological Inventory (CPI)*, also found that certain personality data contributed significantly to the accuracy of prediction of both medical school GPA and faculty ratings of students, and that the effectiveness of the *CPI* as a predictor improved as the criterion moved closer to circumstances of professional practice.

Similarly, Watley and Merwin (1964) found that personality measures definitely increased the accuracy with which academic achievement for business students could be predicted, and specifically that the Restraint Trait score of the *Guilford-Zimmerman Temperament Survey* had higher predictive validity for this group of students than did the *Scholastic Aptitude Test*. The relation between personality and survival in law school was studied by Miller (1967), who found that profiles on the *Myers-Biggs Type Indicator* administered during the first week of classes differed significantly between students who dropped out and those who survived. In contrast, Michael, Haney, and Jones (1966), in a study of 100 student nurses, found that the *MMPI*, the *Edwards Personal Preference Schedule (EPPS)*, and the *Cattell 16 Personality Factor Questionnaire* all showed lack of predictive validity for either academic or clinical work. Finally, in a study of approximately 700 students at Iowa State University College of Engineering, Lewis, Wolins, and Hogan (1965) found that the 10 most relevant scales of the *SVIB* together with two ability measures (high school GPA and Iowa State University *Mathematics Placement Test*) all produced significant and valid differentiations between successful and unsuccessful students and among the several groups who dropped out for different reasons.

Research on Measures of the Educational Environment

Research at various educational levels suggests that the predictive validity of any instrument depends not only on the validity and reliability of both the predictor and the criterion measures but also on the nature of the environment in which the examinee is expected to function. Further support for these findings was provided by Bentley (1966), who, using the *Miller Analogies Test* and certain of the *Minnesota Tests of Creativity* to predict scores of 75 graduate students on a specially designed criterion measure of cognition, memory, convergent thinking, divergent thinking, and evaluative skills, found that creative ability contributed to academic success but concluded that in those academic settings where cognition, memory, and convergent thinking tend to be highly valued, creativity may well be unduly penalized, particularly if it is associated with only average IQ.

The interaction of individual and situational variables at the professional school level has been most systematically analyzed in the unusually comprehensive and well designed interschool studies (Hutchins, 1964; Johnson and Hutchins, 1966) conducted under the auspices of the Association of American Medical Colleges (AAMC). In these studies the following instruments were administered to the entire entering class of 28 medical schools selected to be representative of the national population: the *MCAT*, the *Study of Values*, the *EPPS*, the *SVIB*, and the *Medical School Environment Inventory (MSEI)*. Additional current and historical data of an objective nature were collected on the educational environment in each of the 28 schools, performance data for each year and peer ratings were collected for each student in the sample, and the *MSEI* and certain of the personality measures were repeated with students in the fourth year of the medical curriculum. These data, supplemented by computer analysis of all AAMC records on the 180,000 students who entered a medical school in the United States between 1949 and 1962, revealed that the medical school dropout tended to be older, to report more health and personal problems, to score lower on the *MCAT* and on premedical GPA than the successful student, and to differ from him with respect to certain values. Despite these observed differences, the authors concluded that "successful and unsuccessful students are far more similar than different" and that individual characteristics are primarily important in terms of their interaction with the environment.

Research on Measures of Educational Output

Determination of Critical Performance Requirements

One of the most important recent developments in identification of the critical components of professional competence consists of the application of the critical incident technique to certain of the medical specialties (Miller, McGuire, and Larson, 1965). Further research on the reliability and validity of that technique in other areas was undertaken by Andersson and Nilsson (1964), who, on the basis of a study of alternative methods of collecting and coding incidents and of supervisors' rating of the importance of the resulting categories, concluded that the technique as commonly employed does have a high degree of reliability and validity.

Studies of Conventional Test Forms

Employing systematic process analysis, Miller, McGuire, and Larson (1965) found that written examinations of the objective type commonly employed in at least one major medical specialty tended to assess primarily the recall of information. Utilizing a similar method in the analysis of tape recordings of oral examinations, Evans, Ingersoll, and Smith (1966) reported that this technique as currently utilized in medicine also measures primarily the recall of information. Additional support for these contentions is to be found in Schumacher's (1964a) comprehensive interschool study of the various criteria of medical student accomplishment. On the basis of a factor analysis of such medical student evaluations as course grades, scores on *National Board Examinations*, and peer ratings (of functional knowledge, diagnostic skill, and skill in effective relations with the patient), Schumacher concluded that the majority of measures currently employed in medical school "measure a single dimension: general medical knowledge," that skill in patient relations is reflected to some extent in fourth-year course grades, and that other critical components of competence are measured, if at all, only to a very limited degree.

Research and Development of New Types of Tests

In view of the fact that professional competence seems to entail such a broad spectrum of knowledge, skills, and abilities, the frequent finding that most conventional measures seem to assay primarily the recall of information has led a number of investigators, especially those in the health professions, to explore alternative techniques of assessment. Thus, tests designed to assess both students' and clinicians' ability to interpret a variety of types of visual and auditory findings presented in realistic form have been reported by several investigators. For example, Levit (1964) found that objective tests based on motion pictures contributed substantially to the validity of assessments of observational skill and related components of clinical competence. Similarly, Evans and Bybee (1965) found that test items based on a standard set of taped heart sounds reproduced through individual stethophones yielded valuable information on the diagnostic skill of second-year medical students, on the basis of which it was possible to derive specific indications for required changes in course content.

Among the most interesting new developments in medical testing has been the application of simulation technique to the development of both linear (Hubbard, 1966) and branched (McGuire and Babbott, 1967) problems in patient management which require sequential analysis and decision. Both types of problems are suitable for either individual or group administration and are amenable to either clerical or computer scoring. Each problem is initiated by a brief verbal description of the patient's chief complaint or by a short color film in which the patient describes his current illness. The examinee must then decide how he will approach the problem; he records his decision by erasing the opaque overlay on a specially constructed answer sheet to reveal the results of his decisions presented in as nearly realistic form as possible. Problems in the branched format are designed to permit alternative approaches and a variety of pathways. Consequently each such problem contains many sections, some of which are not necessarily relevant to the optimal management of the patient, in order to allow for the fact that the complications which must be managed differ from student to student depending (as they do in the office or clinic) on the unique combination of specific procedures each has elected at earlier stages. Each stage in the work-up and the response to each procedure the examinee may elect are meticulously designed to simulate an actual clinical situation. Results to date suggest that the technique has promising implications for use in many fields and at various educational levels.

Performance Ratings

The need for, and one approach to, improvement of performance ratings is illustrated by Natkin and Guild's (1967) study of the evaluation of preclinical laboratory performance. These authors initially found arbitrary and inconsistent variation in standards applied by six raters such that in 45 percent of the cases student ratings ranged through four or more of the nine points available in the grading scale, reasons for the assigned rating varied widely, and the weight placed on the same deficiencies differed greatly among the several raters. By distributing a set of guidelines and step-by-step instructions for applying them, the experimenters significantly reduced these discrepancies. The addition of up to eight training sessions on the application of the guidelines did *not* further increase inter-rater reliability of rankings. Similarly, in an attempt to evaluate teacher behavior, Bloom and Wilensky (1965) utilized a Skinnerian framework to construct an observational scale for rating the information giving, response elicitation, feedback, and control behavior of teachers. They reported that in 26 pilot observations of four teachers the scale yielded high inter-rater reliability (0.90) and significant discriminations among the four subjects.

In a very interesting and comprehensive study of the interaction of skill and attitudinal variables in medical student and clinician performance, Liske, Ort, and Ford (1964) reported that both student and faculty physicians with lower performance ratings tended to see problems in the doctor-patient relationship in terms of attributes of the patient and tried to deal with them impersonally while continuing to demand personal recognition and attention for themselves; in contrast, those who were rated as skillful in providing comprehensive care tended to define the problem in terms of their own personal attributes and tended to exhibit humanitarian concern and personal responsibility in relation to others. It is additionally interesting to note that these observational rankings and attitude assessments show no significant correlations with scores on the *MCAT*, the *National Board Examinations*, the *Study of Values*, or the *EPPS*.

Finally, various applications of peer ratings and other multiple assessment techniques have been favorably reported, particularly in industrial and managerial settings. Roadman (1964), in a follow-up study of 56 graduates of four-week middle management training classes, reported that mean peer ratings of those graduates with two or more subsequent promotions differed significantly from others on all but three items (emotional maturity, cooperation, and tact) of the lengthy peer ratings administered during the training program. Similarly Albrecht, Glaser, and Marks (1964), in a study of the correlations between ratings of 31 middle management personnel and results of an assessment battery including intensive interviews, personal history forms, a sentence completion test, a human relations problem test, and the *Watson-Glaser Test of Critical Thinking*, concluded that multiple assessment techniques provided far better predictors of performance than did the "intellectual function tests."

Research on Interest, Attitude, and Personality Assessment

Studies on Standardized Instruments

There appears to be increasing interest in analyzing the interest, attitude, and personality patterns of aspirants to different professions. For example, Solkoff and Markowitz (1967) administered a battery of personality tests and attitude scales to 178 freshman medical and 198 freshman law students in one eastern university. They reported that law students were more extroverted and sociable, while medical students were more introspective, idealistic, and more sensitive to the needs of others, and that the medical students expressed greater humanitarianism, less cynicism, and less authoritarianism on the attitude scale. Similarly, in a large sample study of career preferences expressed by medical interns, Schumacher (1964b) found significant differences in abilities, interests, and personality among groups choosing different types of medical careers.

Gillis (1964), utilizing Stern's *Activities Index* and the *College Characteristics Index* with over 1,000 education students, reported that on 18 of the 30 scales the needs of these future teachers differed significantly from the sample on which the instruments were normed; of particular concern was his finding that this population demonstrated significantly higher dependency needs, less aggressive and risk-taking behavior, and "less need for intellectualism."

New Instrument Development

O'Shea, Lefcowitz, and Gray (1966) described two self-administered questionnaires designed to measure family and social background and attitudes and aspirations and administered them to some 2,000 students in 16 dental schools. Among other interesting findings, responses to the questionnaire revealed a disturbing student antipathy toward faculty. The authors concluded that the faculty probably provided far less support than did family, peers, and patients in the student's development of his own self-image as a dentist.

Robbins (1967) described a technique utilizing the equal-appearing intervals and paired-comparison methods to develop a scale designed to measure the attitudes of teachers toward teaching as a profession. He reported that the scale showed high test-retest reliability (0.95 to 0.99) and that it differentiated in the expected direction among groups of pre-service teachers, graduate teachers, administrators, and college professors.

In summary, current research suggests there may be important interest, attitudinal, and personality variables that influence choice of profession; however, attitudinal shifts during the period of professional training are relatively slight, or our instrumentation is still too gross to detect relevant changes that may be occurring.

Long-Term Follow-Up Studies of Professional Education

Ultimately, those responsible for professional education are concerned to find more reliable and valid methods of predicting professional performance. Unfortunately, no satisfactory measures of the criterion variables are readily available. The complexity of this problem is illustrated in the investigations of Price and others (1964), who studied on-the-job performance of four physician groups: those in academic medicine, diplomates of specialty boards, and physicians in general practice in urban and in rural areas. Eliciting some 200 measures of on-the-job performance, they selected 4 constellations of 80 measures representative of the salient characteristics of each group. The authors concluded that "performance in formal education . . . comes out as a factor completely independent of all factors having to do with performance as a physician."

Finally, in a classic study of the career development of 342 talented individuals, Ginzberg and Herma (1964) found that some 15 to 20 years after completion of their graduate studies, all were in the "two highest rungs of the occupational ladder," i.e., professional or technical work or managerial positions. Despite this "success story," the authors found many obstacles to the conservation and utilization of talent and many sources of frustration in the life styles of the talented individual. Chief among these were the financial barriers to further training, the rigidities in educational and guidance structures, the unreasonable demands and pettiness in some work environments, the hierarchical organization of various institutions, the informal social values and attitudes that restrict work opportunities in the arts, and the broad social policies regarding military service, discrimination in hiring and promotion, and maintenance of full employment that waste talent.

Summary Comment

As of this date it appears that at the level of professional education much effort has gone into the development and fragmented study of predictors of success without comparable attention either to the construction and validation of reliable criterion measures or to the investigation of environmental influences on success. The challenge is clear!

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CHAPTER VII

Testing the Educational and Psychological Development of Exceptional Children

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Most of the material covered here will be concerned with psychological and educational tests as they are used to evaluate exceptional children. Stress will be placed on the types of measures usually used by school psychologists for purposes of identification and for planning of instruction.

A new Clearinghouse for Exceptional Children, part of the Educational Research Information Center (ERIC), was set up and will be operated by the Council for Exceptional Children. It should be a useful source of information on all aspects of special education including measurement. The February 1966 issue of the REVIEW on exceptional children and Magary's (1967) book offered helpful data on a variety of special education measurement problems.

Approaches to Assessment

Mann and Phillips (1967) deplored what they termed the fractionation of behavior or the recent attempts to identify specific areas of function and dysfunction and to develop remedial programs directed at the specific disabilities. They cited evidence of lack of theoretical support for fractionation and criticized the validation research on these measures and the remedial programs accompanying some of them. Validation of the tests, they maintained, is largely in terms of concurrent validity, and the training programs based on the tests are evaluated by achievement measures closely resembling the diagnostic instruments themselves. They described some of the difficulties in evaluating these instruments because of Hawthorne and placebo effects. The interested reader should read the reaction to this article by Reynolds and the reply by Mann and Phillips, both in the same issue and directly following the main article.

Weiner (1967) proposed that translating test data of handicapped children into meaningful and useful educational prescriptions has been a futile endeavor, resulting in discouragement and frequently complete rejection of tests. It was suggested that systematic observation procedures be developed to evaluate children in natural (normal) settings, and the author provided a general schema for this observation. Zigler (1966), on the other hand, stated that cognitive theorists must continue to use tests, broadly defined, but that they should direct their efforts away from the manifest content such as right or wrong answers and "come to grips with the problem of the cognitive structures and processes that give rise to content." Gough (1965) advocated a similar approach and suggested that there are three levels of evaluation, involving (a) typical test validity and predictability, (b) identification of the underlying psychological dimensionality which leads to predictability, and (c) further analysis which may reveal new situations for which the measure has predictive and explanatory relevance.

Budoff and Friedman (1964) recommended the diagnostic use of "learning potential," defined in their study as extent of improvement in *Kohs' Block-Design Test* scores following a coaching session. Not all coached retardates improved, and the authors hypothesized that those who did improve may be those diagnosed as retarded by use of intelligence tests and who function satisfactorily later in life. Smith and Martin (1967), in a related study of "neurologically impaired" children, found that ability to correct rotations of the figures on the *Bender Visual Motor Gestalt Test* was a better discriminator of impairment than was frequency of rotations. The Pacella (1965) study, mentioned later in this review, provides additional support for the diagnostic value of brief learning tasks.

The crucial task remains that of establishing the educationally significant correlates of test behavior. Prescriptive teaching in the broad sense is an objective rather than a reality, although Peter (1965) presented a model which may be useful in bringing the diagnostician and the educational practitioner into closer working relationship.

Measures of Perceptual-Motor Functions

The period covered by this review witnessed the rediscovery of perception and its elevation to a crucial role in the "explanation" and "diagnosis" of learning disabilities. Children are diagnosed as "perceptually handicapped" or as having "perceptual deficit," and the terms are frequently but unfortunately used as global explanations of complex behavior. This reviewer is reminded of the numerous studies relating the 1916 Binet IQ's etiologically to complicated social phenomena such as crime and delinquency.

The measures of perception appear to tap diverse functions, measuring along different sense modalities and requiring a variety of response modes. The effects of motivation, work habits, energy level, personal organization, and related variables have been almost completely ignored in the research herein reviewed. Thus, one is not surprised, for example, that Haring and Ridgway (1967) found no relationship between academic achievement and sundry measures of perception, directionality, coordination, and balance.

The *Marianne Frostig Developmental Test of Visual Perception* is frequently used in conjunction with a perception training program devised specifically to develop perceptual skills. Maslow and others (1964) described the construction of the test and the nature of the subtests. They provided norms for children and gave some reliability and validity estimates. Olson (1966) tested 71 second-graders with the Frostig and several ability and achievement measures to determine (a) its predictive value for achievement, and (b) the relationship between the Frostig and specific reading abilities. He found significant relationships between the Frostig Figure-Ground subtest and the *California Achievement Tests*, and between the Position in Space subtest and a test of reversible words in context. The Figure-Ground subtest was not related significantly with Gates word recognition, and the Frostig Form Constancy subtest showed "little predictive value." Allen, Jones, and Haupt (1965) cautioned that retarded children who are relatively older chronologically but younger in mental age may nevertheless be perceptually developed sufficiently to score at the upper limits of the Frostig test, thus reducing the discriminability of the measure for that population.

Krippner (1966), using the *Minnesota Percepto-Diagnostic Test (MPD)* with 24 clients in a reading clinic, found that classifications based on the *MPD* coincided in all but two cases with classifications of "organic," "primary," or "secondary" made by graduate clinicians. The criterion classifications were based on a separate test battery. Kreitman (1966) identified 53 emotionally disturbed and 14 "organic dysfunction" elementary school children based on consistency of agreement among test results, school behavior, social history, and medical tests. The *MPD* correctly identified 82 percent of the subjects with respect to their group. All of the organic children were correctly identified. Fuller (1966) tested 87 emotionally disturbed children with the *Wechsler Intelligence Scale for Children (WISC)* and the *MPD*, reporting only three *WISC* subtests significantly related to the *MPD*. None of the *WISC* subtests which are usually considered measures of perceptual ability (e.g., Object Assembly, Block Design, Coding) was associated with *MPD* score. Harrison and Chagnon (1966) gave the *MPD* to schoolchildren with four different language backgrounds and found the scores significantly related to differences in language and in age, but not to sex. The study of Burnett and Fuller (1966) was designed to establish *MPD* norms for educable retarded children and to determine its discriminability between brain-damaged and non-brain-damaged retardates. They reported a barely significant difference between the two groups on the *MPD*.

A study continuing efforts to refine and validate the *Bender Visual Motor Gestalt Test* was conducted by Pacella (1965). Subjects were 22 organic and 22 nonorganic hospitalized retardates, who were given three successive repetitions of the Bender test. The two groups did not differ on the first administration of the test but differed significantly on the third when scored by the Pascal-Suttell method, suggesting the use of changes in accuracy with successive administrations as a differentiating variable between organics and nonorganics. Cellura and Butterfield (1966) studied two groups of mildly retarded adolescents who differed in reading achievement and found no significant differences in Bender scores using either the Pascal-Suttell or the Koppitz scoring procedures. Friedman and others (1967) noted that two groups of children with and without positive neurological findings were not differentiated by the Koppitz scoring system for the Bender test, but they pointed out that the system was not originally designed for this purpose. A manual (Roach and Kephart, 1966) has been prepared for the use of the *Purdue Perceptual Motor Survey* first introduced by Kephart in 1960.

Ayres (1965) conducted a factor analytic study of perceptual-motor dysfunction. The subjects were 100 children with suspected perceptual deficits and 50 children without evident dysfunction. The experimental children were chosen on the basis of teacher observation (learning difficulty, clumsiness, distractibility, hyperactivity), lower scores on performance or perceptual subtests than on verbal subtests of intelligence tests, and IQ above 70. The 50 control children "were chosen to match the dysfunction group on mean, variance, and range of mental age and on sex."

A battery of 35 perceptual-motor tests was administered to each child individually. In general, the factors emerging from the analysis of the two groups were dissimilar. Six factors accounted for most of the variance of the dysfunction group, of which five could be interpreted as behavior correlates of neurological dysfunction: (a) developmental apraxia—represented by tests designed to measure "motor planning and eye-hand accuracy"; (b) perceptual dysfunction, form and position in two-dimensional space—represented by visual tests of form constancy and space relations; (c) tactile defensiveness—represented by hyperactive, distractible behavior; (d) deficit of integration of function of the two sides of the body, manifested especially by inability to discriminate between left and right sides of the body; and (e) perceptual dysfunction, visual figure-ground discrimination—identified by tests of ability to identify superimposed figures. This study is a noteworthy attempt to identify the components of the range of behaviors frequently combined into the term *perception*. It provides a basis for the continual attack on a vexatious class of learning problems.

Mental Ability Tests

The *WISC* continues to be used widely in the evaluation of exceptional children, particularly the retarded in public schools. Baumeister (1964) reviewed a number of studies using the *WISC* with mental retardates. He concluded that (a) the measure does not have sufficient "floor" for the severely retarded, (b) the validity is "not unpromising," (c) it is not effective as a diagnostic instrument, and (d) short forms of the test are not closely correlated with the whole test. Yudin (1966) devised an abbreviated scale which sampled items from the subtests rather than subtests from the full scale. Correlations between the short-form and full-length *WISC* scores were high, but since the scale was taken from protocols already in existence and the author did not attempt any cross-validation, substantial correlations could be anticipated.

Research involving use of the Binet scale with exceptional children was relatively scarce during this review period. Vane, Weitzman, and Applebaum (1966) concluded that there was not characteristic scatter or pattern of items differentiating Negro and white problem and nonproblem children. Wells and Pedrini (1967) suggested a method of using picture vocabulary or verbal vocabulary scores to determine the most appropriate age level for the examiner to begin testing.

The *Peabody Picture Vocabulary Test (PPVT)* was found by Throne, Kaspar, and Schulman (1965) and by Burnett (1965) to yield significantly higher scores than the Wechsler and Binet tests when administered to retardates. Shaw, Matthews, and Kløve (1966) found significant but low correlations between *WISC* and *PPVT* scores but suggested that the *PPVT* may be measuring specific language deficits likely to be present in retarded children. Brown and Rice (1967a) also reported low correlations of *PPVT* with Binet and *WISC* scores. A study by Carr, Brown, and Rice (1967) showed that the correlations of the *PPVT* with the nine subtests of the *Illinois Test of Psycholinguistic Abilities* were significant but low when the tests were administered to 90 educable mentally retarded children. Kahn (1966) obtained *PPVT* scores of retarded youth over a four-year span and concluded that the stability of the measure over that length of time was as great as the short-term reliability. Shipe, Cromwell, and Dunn (1966) noted that emotionally disturbed retarded children had significantly more difficulty with human-content items on the *PPVT* than did nondisturbed children, although both groups found human-content items more difficult.

Cooper and others (1967) were concerned with finding an instrument to discriminate academically disabled Southern Negro adolescents (who had low test scores but showed social competence) from those who "appeared genuinely defective in intelligence." They found the *Porteus Maze Test* to be markedly superior to the Wechsler Scales, the Ammons *Full-Range Picture Vocabulary Test*, and the revised *Beta Test* in making this discrimination. A study by Gambaro and Schell (1966) supported the usefulness of the Porteus test in discriminating between educationally handicapped children who were considered to be either employable or unemployable. Another study investigating the relationship between test results and indexes of social competence was conducted by MacAndrew and Edgerton (1964) with severely retarded subjects. They found highly significant relationships between 16 dimensions of "competent conduct" and IQ scores from the 1937 Stanford-Binet and the 1922 Kuhlmann-Binet.

The Cooper and the MacAndrew-Edgerton studies differ in their conclusions about the relationship between standardized individual test IQ's and social competence; the difference may be a function of racial and intellectual differences in the subjects of the two studies.

Psycholinguistic Functions

The *Illinois Test of Psycholinguistic Abilities (ITPA)* shows promise in the diagnosis of learning problems. Bateman and Wetherell (1965) studied the psycholinguistic functioning of retarded children and found a deficit in the entire automatic-sequential level compared with the representational level. Support for this finding was indicated by Brown and Rice (1967b), who suggested that the academic achievement of low IQ children may be predicted from the Auditory-Vocal Sequential subtest. McCarthy (1965) summarized the results of several validity studies of the *ITPA*. He concluded that the Encoding subtests, especially the Auditory-Vocal Automatic subtest, may deviate from the definition given in the examiner's manual. He recommended the use of additional measures with the *ITPA* for children with linguistic defects.

Weener, Barritt, and Semmel (1967) criticized the *ITPA* on several points: (a) Although it is labeled "Experimental Edition," the demand for the data it promises has led to widespread use as with well validated measures. (b) The relationship between the theoretical description of the levels and the items of the subscales is not clear. (c) Some subtests seem to measure cognitive variables not directly related to psycholinguistic abilities. (d) Norms are based on a restricted sample not appropriate to the likely use of the test. (e) The reliability of the subtests is too low for individual prediction and diagnosis. The authors concluded, however, that the measure has good potentialities as a useful diagnostic instrument. Following this article are a reaction by McCarthy, one of the authors of the test, and a rebuttal by Weener, Barritt, and Semmel.

Subsequent research with the *ITPA* must answer at least two questions: (a) What dimensions or variables does the test actually measure? and (b) How is the test related to educationally significant variables? Ideally, the researcher should compare the effect of teaching based on *ITPA* profiles with teaching based on other diagnostic batteries.

Other Measures and Populations

Reichstein and Rosenstein (1964) reviewed the literature concerned with the differential diagnosis of hearing disorders. The difficulty in diagnosis exists because auditory disorders may be associated with several conditions, e.g., impairment of the peripheral hearing mechanism, central nervous system involvement, emotional disturbance, and mental deficiency. The examiner must consider the diagnostic significance of both the stimuli used in the examination and the response, including the method of indicating the correct response. Dansinger and Madow (1966) administered the Verbal Auditory Screen for Children to 967 institutionalized retardates aged 6 to 85 and concluded that it is an effective auditory screening instrument. Zahran (1965), utilizing several cognitive and personality measures, observed no significant differences in these areas of functioning between blind and sighted children, although the trend of the results appeared to favor the sighted. Emotionally disturbed children ($N=47$) in a state hospital were tested longitudinally by Motto and Lathan (1966), using standardized group measures of educational achievement. Those children who remained in the hospital school 10 months or more achieved up to expectation based on intelligence test scores.

An abstraction test originally developed by the authors for use with cerebral palsied children was adapted by Hammill and Irwin (1966) for use with retarded children. Data are provided on item analyses, reliability, and validity when used with retardates. Hammill and Powell (1967) reported the same measure to be suitable for use with visually handicapped children aged 5-10. A 37-item behavior checklist for screening emotionally disturbed children was developed by Pimm and McClure (1967) and was found to relate significantly to two criteria: referral to special services and teachers' evaluations of behavior. Burg and Barrett (1965) modified the *Geist Picture Interest Inventory* to make it a bisensory test for use with the mentally retarded. Watkins, Stewart, and Ryan (1966) developed the *Animal Sound Test (AST)* for use with retardates having mental ages below 4 years and administered it to 26 children with mean MA 3 years, mean IQ 36, and mean CA 9 years. They reported lower thresholds using the *AST* than with either the pure tone or the speech reception threshold methods. In 1966 the Psychological Corporation published the experimental edition of a new measure, the *Wechsler Preschool and Primary School Scale of Intelligence*, a downward extension of the *WISC*.

Factors Influencing Test Behavior

It is popularly assumed that children, including the retarded, are notably sensitive to variations in the assessment environment, and the examiner must therefore be supportive during the evaluation process. Contrary to this assumption, Silverstein and others (1964) found that high-anxious retarded children tested under the "tough" interpersonal condition did as well as under the "tender" condition. Tough- or tender-minded examiners had no significant effect on test score. Jenkins and Schuell (1965) concluded that aphasics do use an "agreement set," that is, tend to say "yes" when statements are wrong, possibly as a defense to conceal their lack of comprehension. Cleland and Patton (1966) tested the general hypothesis that climate affects test score by comparing direction of change in IQ scores with season of year for retested retarded subjects. No significant relationship was found.

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CHAPTER VIII

Testing the Educational and Psychological Development of Students from Other Cultures and Subcultures

E. PAUL TORRANCE

During the period under review, there has been an unparalleled amount of activity in testing the educational and psychological development of students from other cultures and subcultures. This history, however, has been written largely in the proceedings of international conferences, obscure reports of projects supported by private foundations, foreign journals, theses, and dissertations. Many reports have appeared in professional journals, but these do not put us on the real forefront of current activity in the testing of the educational and psychological development of students from other cultures and subcultures.

Although there have been a few innovations and many modifications of instruments (Coffman, 1965), improvements in tests might be described as "marginal" rather than as "genuine breakthroughs." The prevailing attitude of the period has been that almost any "good" educational or psychological test will elicit differences from culture to culture and subculture to subculture and that these differences are explainable in terms of differences in values, child-rearing procedures, educational procedures, and the like. Attempts generally have been made to select instruments that would elicit these differences fairly or accurately and with complex instruments to discover the factorial structure of abilities from culture to culture.

Intellectual Abilities

Although the American Institutes for Research and other groups have pushed ahead vigorously with huge developmental projects on the assessment of intellectual abilities in other cultures, the results of these studies have not yet been reported in open sources. In open sources, the favorite instruments for assessing intellectual abilities have continued to be the various modifications of the Goodenough *Draw-a-Man Test* and the Raven *Progressive Matrices*, especially in international studies. On the domestic scene, the *Peabody Picture Vocabulary Test* has won some popularity in testing children from various subcultures.

Harris (1963) presented some revisions of the long and frequently used Goodenough Draw-a-Man technique. He developed further the concept of mental maturity and revised the administration procedure to elicit three drawings of the human figure and elaborated the scoring criteria somewhat. He also reported some preliminary work with the revised instrument *(Goodenough-Harris Drawing Test)* in cultures outside the United States and described a more extensive project involving children in several different countries. Reports of the latter study have not yet appeared in open sources, however. Dennis (1966a) reported an international study involving 40 different cultures or subcultures in which he attempted to show that scores on the Goodenough *Draw-a-Man Test* are positively related to increases in modernization within the culture. Grinder, Spotts, and Curti (1964) with preadolescent Jamaican children as subjects showed that scores on the Goodenough instrument were positively and significantly related to skin color when socioeconomic factors were not controlled. When their subjects were divided into five socioeconomic groups, however, these differences lost their significance.

The Raven instrument has been used to study ability testing, as reported by Irvine (1966); to control for intelligence level in comparative studies, as reported by Johnson and Anderson (1964); and to identify for comparison intellectually gifted groups, as reported by Torrance and Johnson (1966). Much of Irvine's work had been in African cultures. In one African society, the instrument proved to be unsusceptible to environmental influences traditionally assumed to be important generators of differences among groups. One of his major conclusions was that the perceptual context of the items is related to the kind of reasoning demanded by the test and that this dual perceptual reasoning results in a variety of strategies that are difficult to determine. He also concluded that intercultural differences in exposure to perceptual tasks may produce sets that limit an individual's flexibility of approach to figural items and that differences in learning opportunity affect directly the extent to which reasoning within a perceptual frame can be exercised. He warned quite strongly that a measure will by no means be unbiased simply because it is based on figural or low verbal content. He argued that it will simply be biased in ways that are different and, probably, more difficult to define.

Johnson and Anderson (1964) studied mathematics learning among 13-year-olds in the Greater London (England) and Twin Cities (Minnesota) areas. Large, carefully selected samples in both geographical areas were administered both a British and an American test of mathematics achievement, and the Raven instrument was used to control for differences in intelligence. Even with this correction, the American youngsters scored significantly higher on the American-made test and the London students scored significantly higher on the British-made test. When money problems were eliminated, these differences faded out. Using these and additional data, Torrance and Johnson (1966) identified groups in the two countries with IQ's of 130 and above for further study. The similarities of the two gifted groups were indeed striking. There was little difference in the distribution of parental occupations, in the number of books in their homes, and in their assessment of the value of education. The families of the gifted Londoners appeared to be much more mobile than their Twin Cities counterparts. The Twin Cities gifted students seemed to place greater importance on present success in mathematics and spent more time on outside study than did their London counterparts.

A variety of studies have been concerned with tests of specific intellectual abilities. In a study of Southern Negro and white college students, Needham (1966) used a battery of Guilford's divergent thinking tests, Guilford's *Seeing Problems* test, and the Guilford-Zimmerman *Verbal Comprehension Test,* along with a number of nonintellectual tests. The Negro subjects were lower than the white subjects on the various intellectual ability tests. Iwao and Child (1966) compared the esthetic judgments of American experts and Japanese potters. The Japanese potters tended to agree with the American judges (61 percent for black-and-white slides of art work and 57.5 for reproductions of abstract paintings). Ford, Prothro, and Child (1966) also studied differences in esthetic judgments among American art students and experts compared with Fijians and Greek craftsmen. Again, there were tendencies to agreement, but the degree was significant only with the Fijians ($r = 0.56$). Suchman (1966) reported cultural differences in children's color and form preferences, using Euro-American and Nigerian subjects.

Torrance and his associates have engaged in a program of international studies of creative development during the past seven years. As of this date only a few of the results of these studies have been published in open sources. Both verbal and figural tests have been included, and children from first through sixth grade have been encouraged to respond in the language with which they are most familiar. No adaptation from culture to culture has been made in the test tasks except for translation into the native languages of the subjects. Deliberate efforts were made to present universally common stimuli or universally strange stimuli (such as improbable situations). Scoring of fluency, flexibility, and elaboration has been accomplished by the same set of guides for all cultures (Torrance, 1966). Separate guides for scoring originality were developed for each culture or subculture, taking into consideration the statistical frequency of a particular response within the culture. Preliminary results for figural originality have been reported by Torrance (1963) for the following samples: U.S.A. comparison group (Minneapolis, Minnesota), U.S.A. Negro (Georgia), Germany (Berlin), Australia (Western), and Western Samoa. The shape of the developmental curve varied from culture to culture with the U.S.A. comparison group sample showing the greatest discontinuity (drop) in development at the fourth-grade level and the Western Samoan sample showing the greatest degree of continuity. A separate study by Johnson (1963) of the Western Samoan data revealed that the fourth-grade slump still occurred in a mission school taught by American-trained teachers. Gowan and Torrance (1965) reported preliminary results from a multiculture study in Malaya. The drop in productivity at the fourth-grade level was confirmed. The most severe drop was experienced by children taught in the English medium rather than in their own language.

During the reporting period, there has been a growing trend to examine the structure of abilities within various cultures and subcultures by administering a battery of tests and subjecting the data to factor analysis. Guthrie (1963) studied the structure of abilities in a non-Western culture (the Philippines), and Semler and Iscoe (1966) attempted to study the structure of intelligence in Negro and white children in Texas. Guthrie, using a battery of 50 tests, extracted 22 factors for his Philippine subjects. Verbal, numerical, rote memory, visualization, and speed factors were similar to those found by others, but the English verbal factor was separate from the native language (Tagalog) factor. Semler and Iscoe used the Raven *Coloured Progressive Matrices* and the *Wechsler Intelligence Scale for Children*. The intercorrelation matrices on the Raven instrument were similar for white and Negro subjects, but the intercorrelation matrices for the Wechsler showed heterogeneous dispersions.

Achievement

A national study of great complexity and possible import is one in India conducted by R. H. Dave. In this project, attempts are being made to produce equivalent forms of achievement tests that make adaptations for a great variety of subcultures and languages. The UNESCO project on the educational achievements of 13-year-olds in 12 countries (Foshay and others, 1962) illustrates problems and approaches to most of the issues in this kind of educational and psychological testing. In fact, one of its major purposes was to throw light on the possibility of conducting such studies. It represents a collaborative effort among 12 different research centers. Attempts were made to factor-analyze the different tests in such a way as to discern patterns of intellectual functioning and achievement in such basic subjects as science, mathematics, geography, and reading.

Husén (1967) reported comparisons of mathematics achievement in the same 12 countries. Corrections were made for differences in proportions of age groups measured in the various countries. Even here American students stood only at the middle of the group, outscored by countries like Japan where mathematics commands more public approval as an outcome of education important for all students.

Douglas and others (1966) compared Scottish children with English and Welsh children on the basis of test scores and allocation to selective courses after primary schooling. The direction of the differences varied from one type of measure to another and at different ages. A greater proportion of Scottish than English and Welsh children in each social class was allocated to selective schools. King (1965, 1966) reported additional analyses of the data from the London and Twin Cities comparative study of mathematics achievement already mentioned. In the London sample, he found that students from the grammar and technical schools achieved consistently higher mean scores on all of the measures of achievement. The differences were even greater when adjustments were made for individual differences on the ability test (Raven *Progressive Matrices*). The grammar school students also achieved higher scores than did the American public school students. King also found that both boys and girls from single-sex modern schools do consistently better than those from coeducational schools. In the grammar school sample, girls were superior to boys on the relatively nonverbal, highly computational British-made test, and the boys excelled the girls on the American-made test. Personke (1963) compared the spelling achievement of groups of Scottish and American (Jackson, Michigan) children and found that the Scottish children excelled the American children at all ages.

Personality Development

In open sources, there are far more studies involving tests of personality development and functioning than in the areas of aptitude and achievement. They include studies of interpersonal values, social maturity, family values, body image, level of aspiration and achievement motivation, egocentric thought, self-disclosure, adolescent adjustment, anxiety, extroversion, mental health concepts, authority attitudes, child-rearing attitudes, concepts of the ideal child, concepts concerning divergency, attitudes concerning aging, and the like. Space limitations make it impossible to describe these studies, but three book-length reports must be mentioned. Dennis (1966b) used children's drawings of the human figure to study the group values of various cultures and subcultures. Several investigators in a volume edited by Vogt and Albert (1966) used a variety of procedures to study the values of five cultures in the Rimrock area. One of the most promising tests in this reviewer's opinion is the Magic Man Test—not yet in print—which projects the subject into a variety of "just suppose" situations that elicit values. The third of these books (Guthrie and Jacobs, 1966) illustrates the use of the interview as a major instrument for studying personality development in the Philippines.

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CHAPTER IX

Testing in the Evaluation of Curriculum Development

ROBERT E. STAKE

There are more ways than one to evaluate a curricular program. Some of the ways, but not all, involve the use of educational tests.

This review of research on testing in the evaluation of curriculum development is new to the REVIEW series. The need for separate consideration of testing as a part of curriculum evaluation has emerged as more educational researchers have joined Cronbach (1963) in realizing that conventional testing instruments, although effective in differentiating among the aptitudes or accomplishments or inclinations of individual children, are not always efficient, nor even valid, for differentiating among the effects of school curricula.

To deal more forcefully with the theoretical, methodological, and administrative problems of curriculum evaluation, AERA established a Monograph Series on Curriculum Evaluation. One volume (AERA, 1967), with papers by Tyler, Gagné, and Scriven, is currently available. The Association for Supervision and Curriculum Development (1967) has emphasized some of the same problems in its 1967 Yearbook, *Evaluation as Feedback and Guide*, as has also the National Council for the Social Studies with its thirty-fifth Yearbook, *Evaluation in Social Studies* (1965).

The roots of current developments in curriculum evaluation are nourished by the literature of testing for individual differences. Frequently cited precedents in the pre-1964 test literature are those by Dressel and Mayhew (1954), Gulliksen (1950), Lindquist (1951), Lord (1956), National Society for the Study of Education (1963), and Smith and Tyler (1942). Representative of other wellsprings are the experimental design guidelines of Campbell and Stanley (1966); Skinner's (1959) cumulative records; the rationale of the survey techniques of Stephan and McCarthy (1958); Bobbitt's (1918) writings on curriculum goals; Mort's (Mort and Furno, 1960) studies of the influence of local economic factors on curriculum change; Smith, Stanley, and Shores's (1950) treatise on curriculum development; and Guba's (1965) model of educational innovation.

Models and Methodologies

The desire for evaluation of educational programs is not new, but the current abundance of models for evaluating is. The challenge to traditional curricula since Sputnik and the increasing federal and philanthropic-foundation interest in education have stirred the curriculum developers. An accompanying concern for evaluation stirred the model builders. Some of the new models emphasize the use of conventional tests, but others do not. Other differences among the models are apparent with regard to (a) the importance of the classroom teacher as a developer of curricula, (b) reliance on the developer's intuitive rather than rational skills, (c) emphasis on subject-matter-content goals as opposed to intellectual-process-and-skill goals, (d) whether or not assessments will be limited to the developer's stated goals, and (e) the importance of incorporating plans for reassessing goals during and after the developmental phase (Stake, 1967a). It is to be expected that models with different foci will lead to different methodological strategies and to different field operations.

One class of evaluation strategies emphasizes measuring the discrepancy between intended and attained behaviors. This emphasis usually relies on the ability of the educator to specify and measure critical behavior. An important distinction was made by Glaser (1963; also Glaser and Cox, in press) between tests (criterion-referenced measures) used to find out what a student can do and tests (norm-referenced measures) used to find out the relative standings of students. To develop a science curriculum the AAAS Science Commission on Science Education (in press), in a project directed by Walbesser, devised an evaluation plan with emphasis on specifying behavioral objectives, developing process exercises to elicit the behaviors, and testing the resulting behavioral repertoire. Dyer (1967) claimed that through teacher-tester dialogue tests should be so successfully tailored to objectives that good teaching would be specifically "pointed at" the tests students take. Metfessel and Michael (in press) developed a step-by-step procedure for such a behavior-oriented dialogue.

Another class of evaluation strategies emphasizes collecting information most relevant to the decisions a curriculum developer must make. Seldom is the developer deciding how well students meet their goals or whether this or that textbook does a better job. His decisions relate to emphases, style, and illustrations. Which alternatives contribute to more effective instruction? In this regard, the curriculum evaluator is little different from the researcher in the classroom learning laboratory (Cronbach, 1963). Both are searching for durable relationships on which to base instructional sequences. The model most explicit in concern for decision making is Stufflebeam's (1966). He proposed a feedback model for the development and revision of curricula, with attention to the special features of government-funded projects.

Forehand (1966) discussed the difficulty of considering an experimental curriculum as a single treatment in an experimental design. He and Atkin (1963) both spoke of how the curriculum developer and the curriculum evaluator differ in frame of reference. Taylor and Maguire (1966) presented a model highlighting the transition in goal statements as they pass from philosopher to developer to task-writer to teacher. Stake's (1967a) model emphasized the diversity of information potentially useful to the curriculum developer and devalued behavioral objectives.

A third class of strategies for evaluation emphasizes the decisions that a practitioner must make: the decisions of purchase, the decisions of allocation of teaching resources, the decisions of arranging the instructional setting and adapting the curricular program to student needs and capability. For an emphasis on purchases and allocation of resources the methodological issues raised by Scriven (1967) are pertinent. In one discussion he offered the pool of criterion-referenced test items as both the major, immediate, evolving statement of curricular goals, as well as what we expect it to be, i.e., the source of subtests for measuring developer, teacher, and student success. Scriven claimed that a minimally adequate summative evaluation experiment (e.g., Is this a better curriculum than that?) is vastly expensive, but necessary. Elsewhere, Stake (1967b) proposed a rationale for evaluating equipment and materials for the newly created Educational Products Information Exchange based both on the logical match between local intent and product specification and the empirical match between previous outcomes and local conditions of use.

A three-dimensional model for aiding local schools in evaluating their own curricular developments was circulated by Hammond (1967). The intersection of (a) type of anticipated behavior, (b) instructional setting, and (c) institution (personnel) is this model's locus for the exercise of "local option." It is obvious that the periodic accreditation-agency evaluation studies place heavy reliance on subject matter-oriented self-studies. Comparing 11 schools that completed a handbook-guided self-study to schools that did not, Boersma (1967) found that teachers in the self-study schools were more concerned about the curriculum, had a clearer perception of what the curriculum was, and exhibited greater support for using objective procedures for discussing and changing the curriculum.

Issues in Curriculum Evaluation

Many developments reported in *Educational and Psychological Measurement* and in other methodological journals are of potential value to curriculum evaluators. Three developments of particular interest to workers on large-scale evaluation programs relate to objectives, the universe of behaviors to be tested, and the question of unmatched testing.

That identification of school objectives is important is beyond dispute. However, the centrality of their role in curriculum development is still within dispute. How much effort should the evaluator expend asking educators for their statements of behavioral objectives? Even if with little effort, what does he then have? Clearly, evaluation plans oblivious to the purposes of the people involved will be at best superfluous; more likely, invalid. But there are various ways of gathering, specifying, and evaluating objectives.

In the tradition of Tyler and Skinner, many evaluators and developers use goal specifications as a base from which to derive teaching and testing tactics (Lindvall, 1964). Others proceed more intuitively without explicit goals, letting first efforts be corrected in retrospect or improved through second efforts. Krathwohl (1965), advocating explicit statements, spoke of the need for different levels of behavioral specificity: broad and abstract behavior classes for the curriculum as a whole and specific and detailed behaviors for the daily lesson. Gagné (1967) suggested that "descriptions of the expected capabilities of students" (very specific behavioral objectives) be used for both the development of the curriculum and the evaluation of the production. The dangers of oversimplification and erosion of purpose were cited by Atkin (1963).

Kropp, Stoker, and Bashaw (1966) investigated the hierarchical characteristics and the construct validity of types of objectives in the well known *Taxonomy of Educational Objectives: Cognitive Domain.* Their report includes valuable information for researchers on whole-test operational definitions of taxonomy categories, steps in test development, and problems encountered in the process of interpretation of the tests. A seldom-discussed purview of objectives was investigated by Maguire (1967), who found four "value aspects" to be stable across different sets of teachers and objectives. These goal-statement aspects were described as subject matter value, motivational qualities, ease of implementation, and statement properties. Ikeda (1965) used teacher estimates of "suitability for testing" of carefully constructed test items as indication of their internalized objectives and then explored relations between these objectives and student achievement.

It is not altogether reasonable to let a unidimensional baseline stand for that common curricular objective, "content mastery," although psychometrists have done so for years. Their test theory required it; test characteristics (e.g., predictive validity) were available when they did. In 1961 Ebel called for a new accommodation of theory to practice. He asked that tests, more than anything else, be meaningful. If a test is to be meaningful to most curriculum developers, the thinking and responding during the test of a high-scoring student must coincide with the thinking and responding aimed for by the developer. Not only must the behavior be of the right kind; it must, in its scope, depth, and quality, be representative of the particular universe of criterion behaviors.

A theory of generalizability for selecting from a universe of behaviors (or more specifically, from a universe of items) was further developed by Rajaratnam, Cronbach, and Gleser (1965). The universe need not be homogeneous; subsets or strata are to be expected. If the universe of items is agreed on, the degree to which performance on a test is an indicator of successful teaching becomes a function of the procedure used in sampling from the strata. Building upon the programmatic testing of Hively (1963) and task analyses of Gagné (1962), Osburn (in press) offered a procedure for composing items for universe-defined achievement tests.

Cronbach (1963) proposed evaluating curricular impact with unmatched tests—tests designed to present different questions to different examinees. In 1955 Lord drew attention to an increase in explained variance when items were randomly assigned to students. Later, Cook and Stufflebeam (1967) and others demonstrated empirically that group performance is more efficiently measured using small subsets of items distributed among large numbers of students than vice versa. Osburn (in press) summarized the situation as follows: "Insofar as the investigator is interested in the absolute score of an individual it does not matter whether matched or unmatched data are collected. If he wants relative scores for individuals, then matched data are required. If he wishes to estimate the mean for a group of persons, and proposes to generalize over persons and items, then unmatched data would be preferred."

Evaluation Studies

In this section a number of recent evaluation studies are cited. The task of being representative here is impossible; there is too great a variation of technique and purpose across subject matter, grade level, teaching style, and student type. The subsections below contain several of the many noteworthy studies. Almost all current evaluation studies are defined by a certain content—which may be their sole distinction from instructional research studies. How curriculum developments in mathematics harmonize with those in science or social studies is an evaluation research topic not yet activated.

From a massive 27-part empirical study organized by the Coordinating Center for the Cooperative Research Program, Bond and Dykstra (1967) found little evidence of difference in outcomes of first-grade reading curricula. Page (1966) found that prose variables from natural language processing could be combined to provide a respectable indirect measure of writing skill. Birkmaier (1966) offered a set of standards for evaluating foreign language instruction.

Williams (1966) designed a study to compare three prominent arithmetic curricula, with testing in over 200 English elementary classrooms. Cahen (1965) reported the progress of the National Longitudinal Study of Mathematical Abilities. Scandura (1966) offered developers and evaluators a "set function language" to facilitate the formulation of curriculum research questions. The development of experimental problems for evaluating elementary science programs was discussed by Karplus and Thier (1967). Lehman (1967) abstracted 19 research studies by "outsiders" on the effects of Biological Sciences Curriculum Study high school biology materials.

Taba (1966) reported on the development of an elementary school social studies curriculum aimed at developing abstract reasoning. Pupils were found to excel in ability to discriminate, to infer from data, and to apply known principles to new problems without sacrificing knowledge and understandings measured by the more conventional achievement tests. Oliver and Shaver (1966) emphasized measurement of the maturity of students in recognizing and analyzing the ethical issues which confront man in his society. Curriculum project evaluators with responsibility for reporting field trials will find a valuable prototype in Temp's (1966) report on student responses to a newly developed teaching episode.

Sequentially scaled achievement tests, the "guidance system" for individually prescribed instruction, were conceptualized by Cox and Graham (1966). Dimensions for judging children's artwork were offered by Eisner (1963) and Skager, Schultz, and Klein (1966). One of the more thorough reports on curriculum development and evaluation at the professional school level (medicine) was edited by Heine (1962).

Most social and educational curriculum developments identified with the War on Poverty have been part of a heterogeneous package. By intent, aim and technique were left to local educators. The usual paper-and-pencil tests have not been suitable for measuring their impact nationally.

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CHAPTER X

National, State, and Other External Testing Programs

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External testing programs have experienced phenomenal growth over the past few years, but research has remained quite static. Dressel (1964), in predicting rapid growth of external testing, cited four major uses of such tests: admission to college, award of scholarships, placement of students, and acceleration of students. Research has focused mainly on admission to college, emphasizing prediction and the college entrance examinations. Variables of other kinds have been largely ignored, and vocational and technical students have received very little attention in the literature.

Few states have developed unique testing programs, but there is some indication of the development, or plans for development, of state testing programs based on tests which are specially built to state curriculum specifications. Research findings are scarce at this time.

Some evidence exists, however, for an increasing interest in expanded and diversified research. Droege (1966b) did an interesting study with the *General Aptitude Test Battery (GATB)*, used widely by schools and employment services for measuring vocational aptitudes and ability. Pugh (1967) found that it was possible to predict success of Job Corpsmen on the *Tests of General Educational Development (GED)*. Hand (1965) and Tyler (1965) debated the pros and cons of national assessment, a research approach to national educational evaluation which has created some innovative ideas in educational measurement. And one can look to such publications as the annual reports of the Educational Testing Service (ETS, 1967) for illustrations of completed and needed research.

National Testing Programs

National testing programs have become a vital part of the educational process at virtually all levels and for a variety of purposes. A National Council on Measurement and Evaluation Newsletter supplement listed 16 national programs offered on 55 testing dates throughout the 1967-68 year.

Prediction Studies

Angoff (1965) found the *CEEB Scholastic Aptitude Test (SAT)* to be a good instrument for identifying students of superior talent. This study is an interesting follow-up to the findings of an earlier ETS study, that adding certain types of new material to the *SAT* significantly improved its validity for predicting the college performance of students of high ability (ETS, 1967). Generally, however, the predictive validities for the various admissions tests do not reflect this kind of success. Lins, Abell, and Hutchins (1966), in a study involving the *SAT* and the *American College Testing Program Examination (ACT)*, found that they were unable to equate the *SAT* and the *ACT* and that, since predictive capabilities of the tests were not strong, the use of "cutoff" practices by some college admissions offices was dubious. Another interesting aspect of this study was the examination of other variables which might affect college success. For example, it was found that grade point averages (GPA) were not related to the rigor of high school courses. University underachievers were found to have had higher average numbers of high school academic units, especially in mathematics.

Boyce and Paxson (1965) studied the predictive validities of 11 tests at one state college using the *ACT*, *SAT*, and other tests. Using the GPA at the end of the first quarter as a criterion, they found validities to be quite moderate, ranging from 0.42 through 0.64. One limitation in much research of this type is the relatively short period of time in college represented in the criterion. The first quarter, a period of about three months, involves to a marked degree such factors as personal and emotional adjustment to the college environment. Another element which suffers for lack of research is the validity of the GPA as a criterion. In a study by Marascuilo and Gill (1967), neither the *Miller Analogies Test* nor the undergraduate GPA of doctoral students in education was able to distinguish very well between successful and unsuccessful students. Variables such as commitment to scholarly work, time of important life decisions, length of time working on the B.A. degree, and other such factors appeared to carry the most influence.

Thorndike (1963), in a study on the prediction of vocational success, found that the Air Force tests used with applicants for aircrew training in World War II were not good predictors of later job success. His conclusions were that the group may have been too homogeneous, with the tests not designed to bring out different measures, and that the tests were inappropriate for civilian jobs. Pugh (1967) found that pretesting Job Corpsmen with the *Stanford Achievement Test* furnished a valid predictive measure of performance on the *Tests of General Educational Development (GED)*. Successful completion of the *GED* enabled Corpsmen to receive Statements of High School Equivalence, offered by many state departments of education, thereby giving them access to many more job opportunities and post-high-school educational and training programs.

Placement

Runde (1966) reported on a study of freshman placement in different courses using parts of the *ACT*. Wagner and others (1967) found that credits granted by the University of California at Davis on the basis of the *CEEB Advanced Placement Examinations (APE)* varied somewhat according to type of course. Credit allowances in mathematics and French were more conservative than in subjects such as history and English. The announcement of the ETS College Level Examination Program, which provides examinations and related services for the measurement of undergraduate achievement, is certain to have an impact on the credit-granting policies and procedures of many institutions of higher learning.

Factors in Test Scores and Score Changes

Barth (1965) found that for successful performance on the *SAT* and the *CEEB Writing Sample* "no knowledge of the terminology of the present school grammar is needed by a student to succeed on the test. Only a knowledge of certain questions of usage and a sensitivity to language . . . are required." Jacobs (1966) studied the *SAT* scores from several hundred students whose scores had increased by 100 or more points or decreased by 75 or more. Changes could not be accounted for, except in some cases where students had a concrete experience to report, such as being ill or under stress during one of the administrations, or where extra reading or other type of enrichment had been a part of the student's experience between test administrations.

Vocational Education Testing

Droege (1966a) reported a study of the effects of practice on scores on the *GATB* which showed that practice effect is a function of the length of interval between testing for certain aptitudes, but he gave no evidence on the effects on retesting after training. In a second study (Droege, 1966b), based on high school students who had been tested on the *GATB*, marked growth was evidenced between grades 9 and 12, but to a much lesser degree between grades 11 and 12. The use of the "band" concept in score reporting increased the stability of the Occupational Aptitude Profiles.

State Testing Programs

In a nationwide survey conducted by the writer in preparation for this chapter, it was found that a few states take no active part in the testing programs carried on within the state by schools or agencies. Many states prescribe a list of available commercial tests, with several states requiring the tests to be used statewide, while others offer tests on an optional basis. Testing programs depending on unique testing instruments are few, but there are signs of change. The State of Ohio (Angel, 1967) contracted with Educational Testing Service for the development of an ability and achievement test battery for grades 4, 6, 8, and 10. Tests developed by ETS in cooperation with curriculum specialists from Ohio schools and universities were first offered in the fall of 1965, but results will not be available until the winter of 1967-68.

The State of Washington has developed a precollege testing program which Lunneborg (1966) described as unique in that it is directed to the decision-making needs of the average high school graduate and not to the admissions needs of colleges. The program provides several important services, including college grade expectancies for students for 38 criterion areas, placement in English and mathematics courses, preselection for advanced placement, and counseling information for school counselors and faculty advisors. The battery of tests is made up of both nationally prepared and contracted instruments and is accompanied by students' and counselors' manuals for proper interpretation and use. A feature of the Washington Pre-College Testing Program is the application of a multiple differential model for academic prediction. The emphasis is turned away from overall predictive efficiency for the group to specified levels of performance in any one of a number of criterion areas. The ideas incorporated in this approach to precollege testing could be studied for use in the vocational and technical fields.

The Regents of the University of the State of New York offer examinations for scholarship awards, achievement testing, and scholar incentive (N.Y. State Department of Education, 1965). Committees of classroom teachers develop Regents examinations in high school subjects to meet course objectives in New York. The Regents Scholarship Examination was recently evaluated (Pearson, 1967) and found well suited for competitive scholarship awards, but less defensible as the sole basis for certifying readiness to benefit from postsecondary education generally. Materials forwarded to the writer from the State Education Department in New York did not include research reports, nor were research studies apparent in the literature. The Regents examinations undoubtedly have had a significant impact on education in New York, as Tinkelman (1966) pointed out, but a visible program of ongoing research could do nothing but benefit such a program.

California is presently making a thorough study of the state testing program. Since the program was mandated in 1961 by the legislature, certain problems have arisen which the State Department of Education has studied (Calvert, 1965). The program has not been in effect long enough to generate much research, although statistical reports have been furnished to the public and participating schools.

The Iowa state testing program has over the years phased into the American College Testing Program. Some of its tests have developed into the *Tests of General Educational Development*, the *National Merit Scholarship Qualifying Test*, and the commercially available *Iowa Tests of Basic*

Skills and *Iowa Tests of Educational Development* (American College Testing Program, 1965).

Hills, Klock, and Bush (1965) issued a revision of the *Counselor's Guide to Georgia Colleges*, with its college GPA expectancies for predictive composites based on high school averages and *SAT* scores. Supplementary information about enrollment in college course offerings add to its usefulness in counseling in high school.

Other External Testing Programs

Two examples of external testing programs other than national or state are given here. The Educational Records Bureau (ERB) is a testing, consultative, and research organization with headquarters in New York City. A comprehensive service is provided for subscribing schools which includes providing test materials for sale to member schools. The program is international in nature, serving schools in several countries besides the United States. Testing materials include selected nationally available instruments as well as instruments developed under the auspices of the ERB. Research reports are published periodically and can be purchased from the Bureau.

The Multnomah County Intermediate Education District, Portland, Oregon, operates a program of test development under a Metropolitan Area Testing Program Board. The testing program combines the use of nationally available and locally produced tests, supported with excellent in-service and interpretive materials. National norms are de-emphasized and all tests are subjected to rigorous local evaluation.

Conclusion

Not all of the discussion on the preceding pages has been developed around research articles. Programs reviewed were often in the formative stage, with little time for research to be completed. Brief mention was made of the national assessment project founded by the Carnegie Foundation, but no research is available since this program is just in the developmental stage. Regional and state programs have contributed little to the research literature. The research on national programs which has occupied a major part of this review is generally quite limited in scope, but hopeful signs are appearing in the research reported in progress from various agencies and organizations. The Educational Research Information Center (ERIC) reports many research projects in progress which appear to relate to the testing field. *Research in Education*, a monthly publication available from the U.S. Government Printing Office and prepared by ERIC, carries brief reports of this research.

Testing programs and their related research have been "college-bound." The new emphasis on vocational and technical education and the availability of related research moneys should be excellent incentives for new test programs and consequent research. Blum (1966) pointed out the need for testing and placement in college drafting courses because of the marked variations in courses and evaluations of students' achievement. This is only one indication of some of the thinking going on relative to the use of tests and test programs in areas other than the strictly academic.

Leonard (1966) contended that testing may be too predominant in the educational scene. The reality of pressures exerted, the undue reliance on tests, and a retarding effort on curriculum are all a part of his thesis that testing supplants faith in human abilities. The problems are real enough that professional people in the field of measurement and evaluation must face such issues squarely with resourceful and appropriate research.

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CHAPTER XI

The Methodology and Technology of Educational and Psychological Testing

SAMUEL T. MAYO*

The pattern of a chapter on general methodology of testing in previous cycles of the REVIEW (viz., February issues of 1965, 1962, 1959, and 1956) has been continued in the present chapter. In addition, the impact of the technology of data processing and automated instruction on testing methodology has been reviewed.

Topics relevant to this chapter also have been reviewed in the December 1966 REVIEW and in two volumes of the *Annual Review of Psychology*. Especially relevant REVIEW chapters are those on factor analysis by Glass and Taylor (1966), computers in education by Hansen (1966), and multivariate analysis by Cramer and Bock (1966). Relevant chapters in the *Annual Review of Psychology* were those on scaling by Ekman and Sjöberg (1965), test theory by Keats (1967), and personnel selection by Guion (1967).

Two new journals relevant to testing appeared during the period reviewed. The *Journal of Educational Measurement*, beginning in 1964, superseded the NCME Yearbook series. *Multivariate Behavioral Research* appeared in 1966 under the auspices of the Society of Multivariate Experimental Psychology.

Several books relevant to methodology are worthy of citation: Anastasi (1966); Brim, Crutchfield, and Holtzman (1966); Cattell (1965c, 1966); Davis (1964); Harman (1967); Horst (1966); Lavin (1965); Magnusson (1967); Oppenheim (1966); Stanley (1967); and Zubin, Eron, and Schumer (1965). The reader is referred to book reviews in *Contemporary Psychology*, *Educational and Psychological Measurement*, and *Psychometrika*.

Construction

No marked innovations were noted for the period reviewed in item analysis methodology. The area of correction for guessing was revisited, or rather, continued to be visited, even though the use of correction formulas seemed to be dying out rapidly. Some seemingly innovative research, however, was done on item format variables.

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Item Analysis

The methodology of item analysis indexes has grown haphazardly and sometimes not too wisely. There has been a proliferation of formulas for indexes of discrimination, often without underlying theory or measures of standard errors. Furthermore, some coefficients, notably tetrachoric correlation, have been difficult to compute. Finally, the upper and lower 27 percent splits recommended by Kelley, while rigorous theoretically and while practically economical for large samples of persons (especially in the heyday of the IBM Graphic Item Counter), can be very wasteful of small person-sample data such as those processed by the teacher in his own classes, the researcher on small projects, or the practitioner in business or industry.

Engelhart (1965) reported a thoroughgoing empirical comparison of several indexes of item discrimination: the tetrachoric, phi, biserial, point-biserial, *D* (the difference between the proportions of persons passing an item in the upper and lower criterion groups), and the Davis. Intercorrelations among indexes for a set of data were reported. *D* was applied in two different ways of splitting criterion groups, namely, the upper and lower thirds and a median split. Engelhart's data supported the conclusion that the easily computed index *D* is remarkably effective in identifying poor items. Furthermore, *D* is more indicative of the actual number of discriminations made by an item than are correlation type indexes. From a time-and-motion point of view, *D* is probably the most economical index to calculate.

Glass (1965) described "a new, easily calculable index of item discrimination for use in the tabulation of dichotomously scored items." He compared it with several existing indexes and cited as advantages its nonparametric character and an exact significance test. The minimum number of test items should be 25 in order to forestall ill effects of item total overlap.

In the previous cycle of the REVIEW, Mayo (1965) cited several papers on the item-total overlap problem. These papers concerned alternative formulas to correct for the spurious component of correlation due to overlap. Cureton (1966a) pointed out that since different items correlate with different sums of remaining items, the reliability of the remainder of the test would vary inversely with the item omitted. He proposed replacing a given test item by a rationally equivalent item.

Correction for Guessing

Cureton (1966b) criticized the all-or-none principle in correction formulas. As alternatives, a linear assumption and a nonlinear assumption were considered in which the relationship was between amount of knowledge in an item and the probability of a correct answer. He recommended conditions under which correction should be applied.

Little and Creaser (1966) found that multiple-choice test items rated as uncertain yielded significantly larger percentages of correct responses than did guesses. This study demonstrated that the basic assumption of the correction-for-errors scoring formula (that all wrong responses are pure guesses) penalized the student by using only those responses of which he feels certain.

Swan and Hopkins (1965) attempted to determine chance-level scores on certain standardized tests, to give their normative equivalents, and to validate empirically the theoretical chance scores. The students taking the test were directed to mark their answer sheets without benefit of test booklets. The test results showed chance variance as potentially serious because many students attempted fewer of the total number of possible items, thereby raising the chance score possibilities for those students who are "answer sheet takers."

Item Format

Effects from applying the familiar rule of arranging items in ascending order of difficulty were studied by Brenner (1964). It is known that increasing order of difficulty results in higher total test scores, especially for speeded tests, but little is known about the effects of item order on discrimination power. Brenner's study employed four forms of an achievement test in educational psychology comprised of the identical set of items in different arrangements of difficulty. Arrangements were contrived on the basis of difficulty order or randomization. When the forms were administered as power tests, it was found that item difficulty order did not significantly affect total test reliability, difficulty, or discrimination. Similar results were obtained in a study reported by Sax and Cromack (1966).

An item positioning effect was noted in an experimental study by Perloff and Wolins (1965) which employed a test of verbal reasoning for college freshman women. A block of synonym items and a block of opposite items were presented in a counterbalanced order design. Synonyms were more difficult than opposites regardless of position, but they were even more difficult when preceded by, rather than when followed by, opposites.

Aiken (1964) investigated the relation of an item's difficulty and the surrounding item-difficulty context. A pool of 135 vocabulary items was divided into three subtests of easy, medium, and difficult levels. Items which were judged as extremely difficult had higher empirical difficulty when they were embedded in other high level items than when they were embedded in either medium or easy level items. The hypothesis of a significant position effect, which was also investigated, was not supported by data.

Norms

The item sampling methodology of Lord (1962), which was reviewed in the previous cycle, was field-tested for clerical applicants by Plumlee (1964). Lord had presented theoretical and empirical evidence that a large number of persons answering a subset of items more nearly resembles large person-sample norms of the total test than do norms based on a small number of persons taking the total test. Lord had cited an example for his method of 1,000 persons and a 10 percent sample of items from a 70-item test. Plumlee explored feasibility for cases with fewer persons and with a 30-item test. Ten samples of 20 persons each were subdivided from the total sample of 200 persons. Estimates of the population mean and standard deviation were made from a 3-item random sample and again from the 30-item total test. Item sampling showed almost identical estimates for the mean but about one raw score of error for the standard deviation. However, Plumlee felt that the promise of better representativeness of the larger-number-of-persons, smaller-number-of-items sample was an important feature in practice.

Cook and Stufflebeam (1967) used items and examinee samples of 10, 25, 33, and 50 percent. Their results supported Lord's conclusion that item sampling is as effective as, if not superior to, examinee sampling in test norming. The sampling design was that of administering all items to all students and later drawing postmortem samples. Results may not be generalizable to a priori cases, and there is need for further research on the latter.

Lennon (1964) and Maberly (1966) described in much detail the procedures used to convert raw scores on achievement tests, based on different norm groups, to a common standard score scale. The usual standard score transformation was not legitimate, since it left several variables related to test variance unaccounted for. The procedures used by Maberly included anchoring to base IQ parameters for a general reference population, use of regression equations in conjunction with equipercentile lines of relation, correcting for attenuation, and correcting for range variation.

Reliability and Validity

French (1965) found extensive evidence that tests, even simple "pure-factor" tests, do not measure the same things for all people. The study related problem-solving styles to the factor composition of tests.

One method of assessing the validity of tests is to factor-analyze them, ideally along with so-called "reference tests." Very little of such research seems to have been done on achievement test batteries. Sassenrath (1965) factored the nine scales of the *Iowa Tests of Educational Development* along with three reference tests and found one strong general factor and one or two weaker factors. This methodology should be applied to other test batteries.

Another methodology which shows much promise in validating test batteries is canonical correlation. In such an application, this method yields information on the interrelationships between the two sets of measurements on the same persons. The methodology was illustrated by Cooley and Miller (1965) and by Cooley (1965). They validated the Project Talent Test Battery against three batteries whose usefulness is well known, namely, the *Differential Aptitude Tests, General Aptitude Test Battery*, and *Flanagan Aptitude Classification Tests*.

Lord (1964) rescored vocabulary test papers and substituted randomly generated responses for omissions. He found consistent declines of from 0.03 to 0.06 in intercorrelations among seven tests as an effect of the substitutions. A rational analysis of test-wiseness as a trait by Millman, Bishop, and Ebel (1965) suggested a set of questions for empirical investigation and called for the development of valid measures of test-wiseness to answer the questions.

Several papers on predictive validity were noted. Waters (1964) compared a 48-item prescreening mental ability test and an 8-item short form against the criterion of the *Armed Forces Qualification Test*. Validity coefficients for the short form were comparable to those for the longer form. Darlington (1967) stated a case for the revival of the coefficient of forecasting efficiency *(E)*. Advantages over alternative indexes were cited. *E* can measure "utility loss," the difference between the best treatment for an individual and the treatment actually given him as a result of his test scores. Tittle and Hill (1967) reviewed previous research on the validity of attitude measures for predicting other behavior. The Likert-type scale was found to be superior to the Thurstone-type scale.

Lawshe's development of synthetic validity (Lawshe and Balma, 1966) tends to overcome the limitations of predictive and concurrent test validation studies as they are frequently performed in industry. The concept was well defined by Balma as "the inferring of validity in a specific situation from a logical analysis of jobs into their elements, a determination of test validity for these elements, and a combination of elemental validities into a whole." Basically, synthetic validity attempts to identify homogeneous job characteristics or elements in heterogeneous but related jobs, to establish levels of each job element, and to validate a testing instrument on the basis of the job element levels. A test that is able to differentiate between levels of a job characteristic or element is retained as being valid for that particular job characteristic. Lawshe's concept of synthetic validation eliminates the success factor (always a tacky problem in test validation) as the validation criterion and replaces it instead with levels of the job characteristic. Furthermore, the concept is well adapted to changing job content. Since tests are validated on job characteristics rather than on jobs, a change in the job content does not in-validate a test instrument. In fact, new jobs could be created and validated tests selected once the different levels of each job characteristic were identified. Since its inception in the early 1950's, synthetic validity has not stimulated a great deal of research in an industrial setting, although various projects have been conducted at various times. The most recent studies were those conducted by Guion (1965) and Peterson (1964). The concept does show a great deal of promise.

Perloff (1964b) recommended that teachers attempt to analyze and separate constituents of the criterion in order to obtain higher validity on cross-validation and higher validity within the school system or between different school systems. A rationale was presented by Perloff (1964a) which suggested that observed score variance should be analyzed not only into true and chance components of variance but in addition into motivation variance. An example of an item on a motivation measuring instrument was given.

The assumption that test scores consist of both independent and nonindependent components of error was tested empirically by Zimmerman and others (1966). An experimental study (Zimmerman and Williams, 1965) had shown a negative correlation between error scores. An equation was derived by Zimmerman, Williams, and Burkheimer (1966) for expressing test reliability as a function of the number of item alternatives for the case in which error due only to guessing is present.

Technology

A wide range of computers have been used to score tests and print out the results and analyses of various types. Obviously, when properly programed, the larger and more complex machines will produce more measures of pupil and item performance more quickly and easily than the smaller machines. Games (1965) used the IBM 1620 with porta-punch cards to score tests and print out test results and item analyses. Olson and Royce (1967) used an IBM 1401 to compute and print raw scores, their percentiles, standard scores, and raw score frequency distribution. Lewy and Crawford (1966) developed a program for the IBM 7094 which scored test batteries of up to 500 items divided into a maximum of 26 subtests and which produced an extremely comprehensive output very quickly.

Recently, many articles have been published concerning optical readers, most of which discuss the technical details concerned with obtaining useful output from these machines. Miller, Doig, and Milliken (1967), however, reported three experimental programs, used in conjunction with an optical reader and a 1401 computer, which scored tests and printed out complete item and test analyses and results for the professor and scores and other pertinent information for individual students on cards. One of these programs provided valuable feedback by telling each student what areas he was weak in and listed for the professor the areas in which a number of students indicated a lack of understanding. English and Kubiniec (1967) described a system made up of an IBM 1230 optical reader, an IBM 534 card punch, and an IBM 7044 computer which scored tests and printed out complete item and test analyses of various types. The optical reader was particularly valuable because it eliminated the time loss, tedium, and much of the inaccuracy connected with most other means of scoring tests. However, more imaginative use of the capabilities of the computer than merely scoring tests was demonstrated by Richards (1967), who simulated the computer composition of a 72-item college entrance vocabulary test and compared it with the man-made *Wide Range Vocabulary Test*. He found that, theoretically, computers could automatically generate such tests at least equal to man-made ones in predicting first semester grade point average. He suggested that computers may completely take over college admissions testing, from composing the test to grading it and reporting the results directly to the individual student's chosen colleges.

Page (1967) also reported an attempt to use a computer for the grading of essay examinations. At present the work in this area is far from complete, but the progress to date is both startling and heartening. Page attempted to simulate human judge behavior with a computer and has, for example, obtained intercorrelations between the computer and human judges equal to those between the human judges.

We can expect to see a far greater use of computers in the future. Green (1966) predicted that with the increasing availability of computers and the increasingly simple computer languages available, the use of algorithms in psychometric analysis will greatly increase, making it possible to deal objectively with extremely complex data. The ability of the computer to handle vast quantities of data can enable us to individualize education, but we must take care lest its capabilities depersonalize education.

Miscellaneous Studies

Kuder (1966) described his unique method of scoring the *Occupational Interest Survey*. It is conceivable that the results may be generalizable to other instruments. The most distinguishing characteristic of the basis of scoring procedure was that Kuder did not use a general reference group. Scores represented the correlation of a person's interests with those in a number of defined criterion groups. This innovative procedure reduced errors of classification by more than 30 percent.

An empirical investigation of whether a curvilinear relationship exists between raw scores and true scores was carried out on 11 college-level achievement tests by Keats (1964). Of the 11 tests, 7 showed nonlinearity, 2 were doubtful, and 2 were linear.

Zavala (1965) published a review of the 18-year history of the forced-choice rating scale technique.

Engelhart (1967) showed that where pre- and post-testing yield comparable scores and where pairing is on pretest scores, the matched groups formula yields the same *t* whether post-test scores or gains are analyzed.

In a pair of *Biometrics* invited papers, Cattell (1965a, b) outlined the essentials of factor analysis at an introductory level. Such a presentation should prove useful both to students of research and evaluation methodology and to experienced researchers who need to brief themselves on this important methodology.

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CHAPTER XII

Critique of the Issue on Educational and Psychological Testing

RALPH W. TYLER

Critics bear the responsibility of judicious appraisal, commenting on the constructive contributions and, at the same time, identifying gaps, inadequacies, and lack of balance that may limit the wide usefulness that is sought for the REVIEW. Because the excellent features of this issue largely speak for themselves, less space will be devoted to their mention, in order to devote more attention to a few significant weaknesses that seem to me to reduce somewhat the value of the publication. But this spatial emphasis on the negative should not cause the reader to underestimate the major usefulness of this issue to research workers, students of education, and practitioners using educational and psychological tests in their work. It is a good publication.

The initial chapter in this REVIEW is an excellent overview of research and publications of general interest to readers concerned with testing in its many contexts. The inclusion of major longitudinal investigations that used testing and the mention of the widely discussed studies of Equal Educational Opportunity and of international comparisons in mathematics achievement afford a stimulating introduction to later chapters that inevitably deal with material that has less interest and excitement to most readers. The treatment of current research on the place of testing in American life is a new subject for the REVIEW. This area of study seems likely to increase in importance in the years ahead so that the inclusion of it in the overview chapter is a promising precedent.

Chapter Subjects

The categories selected for chapter treatment in this issue are more functional from the point of view of most readers than those used earlier. Providing separate chapters for reviewing research on tests designed for different age levels and different purposes assists both the reviewers and the readers in finding and interpreting research studies related to their particular interests. Also, segregating into a single chapter the research relating to the technology and methodology of testing (Chapter XI) facilitates preparation and use of the review.

The subtopics included under each chapter, however, appear to have been selected without any consideration of a common outline. Psychological tests are treated in separate subcategories in some chapters and not in others. In some chapters educational development is a major subject, while in others it receives no mention. The diversity of categories used by the different authors does not provide a helpful variety to the treatment but rather leads to confusion and even misinterpretation by the reader. It is not suggested that the REVIEW follow identical outlines in all chapters, for that would fail to provide for the differences in research problems at different age levels and in connection with different purposes, but it is possible to establish a kind of master outline that can be adapted to the research studies reviewed by omitting sections of the outline in which no significant research has been reported and by elaborating on or minimizing other sections to correspond to the amount and significance of the investigations reviewed. For example, a considerable amount of confusion would be eliminated if each chapter treated in different categories those studies concerned with theoretical questions, such as the possibility of constructing a meaningful measurable concept of intellectual structure, and those dealing with practical problems, such as the values of specified tests for appraising the achievement in reading of disadvantaged children in the primary grades. Under the first of these two major subdivisions, the subtopics could be selected terms of the kinds of theoretical questions which the research investigations sought to answer. The subtopics likely to be most useful under practical problems are those that represent the different educational purposes for which tests are commonly used and in connection with which research studies were made. An illustration of a set of subtopics under educational purposes would be: (a) to aid the teacher in directing and guiding student learning; (b) to assist the administrator in monitoring the school's educational program; (c) to help the teacher, curriculum maker, and administrator in appraising the educational effectiveness of a new curriculum, of instructional materials and equipment, of teaching and learning procedures, and of administrative and organizational arrangements; (d) to provide the student, his parent, teacher, and counselor with information useful for his guidance, placement, and promotion; and (e) to help the administrator in awarding scholarships and fellowships.

Organization of Subtopics

One indication of the maturity of an area of knowledge is its degree of organization. The aim of a discipline is to build a structure in which new findings help to strengthen or modify the existing basic concepts and generalizations, thus increasing the integration and power of the intellectual system. A low level of maturity is one in which new findings are only additive and disparate, providing no crucial evidence on the soundness of the basic structure.

Critical reviews of basic research in older disciplines are typically organized around current significant intellectual issues. The research plan, assumptions, posing of the problems, and the design and the instrument for collecting and analyzing data are scrutinized by the reviewer for relevancy, validity, and reliability. Similarly, the findings are examined in terms of the extent to which they offer significant evidence regarding important moot questions.

There are many reasons why the field of educational and psychological testing is not yet a mature area of knowledge, but its relative youth is no excuse to disregard criteria of intellectual growth. Too much research in this field is conducted without careful efforts to define the basic conceptional structure in which the research is conducted and without clarification of the significant intellectual issues that the findings are expected to illuminate. If the investigators themselves are not explicit in these matters, the reviewers have a responsibility to indicate what research is significant and why. From the broader perspective, the reviewer should do more than is now done in sketching out the unstated matters that are important in understanding the contributions of the research. Some of the reviews in this issue take this responsibility, but on the whole the investigations are treated at a somewhat superficial level without explaining some of the fundamentals that must be considered in judging their significance.

An illustration of this failure to provide the more basic background is the treatment in several chapters of studies that subjected the obtained scores from several tests to factor analysis. For some years, certainly since the time of Truman Kelly, correlations among the scores obtained on several tests have been viewed by some scholars as evidence in support of the view that there is an inherent structure within the human organism, perhaps a neural structure, that controls the patterns of behavior of individuals—an organization that is similar among most, if not all, people in a specified category. It is argued that such an organization of the psychoneural mechanism accounts for similarities in the relative performance of individuals on certain tasks and that the total inherent organization of the mechanism can ultimately be described and measured by identifying the factors and their weightings through factor analysis of the test scores on a very large range of tests. This assumption is quite characteristic of many psychometricians.

On the other hand, many other behavioral scientists assume that the human organism is a highly flexible, not rigidly organized psychoneural mechanism. As a person encounters challenging situations he learns to cope with the demands by a nearly total involvement, differentiating his later reactions through a feedback mechanism that furnishes the cues for modifications of behavior. These scholars, assuming no inherent organization of the psychoneural mechanism, interpret correlations among test scores as arising from contiguity in context in which the person encountered these challenges, or the similarity in the way he perceived different challenges, or the degree of concentration of attention or motivation focused on these challenges, or the result of earlier learning of these response sequences, or some combination of these.

To the scholar operating on the assumption of psychoneural structure in human beings, factor analyses are to be judged in terms of their accordance with this assumption and in their adequacy in defining and mapping this structure. To other behavioral scientists, factor analytic studies are largely judged in terms of their power in testing the basic assumptions, or as offering a practical tool for prediction, or for economy of measurement.

This illustration of investigations involving factor analysis has been elaborated to indicate what seems to me to be lacking in many reviews of educational research. If studies involving the factor analysis of test scores are judged to be significant enough to be worthy of review, the reviewer bears some responsibility of indicating why these studies are important, together with an explanation of what the critical issues are that are illuminated by the investigations. This demand by reviewers should have some influence on developing the field of testing to meet more nearly the standards of a mature area of knowledge.

Selection of Research

The suggested organization of subtopics around theoretical issues and practical uses of tests furnishes one major guide in selecting significant research studies for review. But there are other criteria to consider as well. This issue is generally noteworthy in having made a judicious selection from all the research reports deemed worthy of review. Nevertheless, there are differential standards apparently operating in the selection of material for different chapters. In some, almost all of the research discussed in the body of the text is meaningful and significant, but in others, the reader is likely to ask about many of the reports reviewed "What does that add to knowledge?" or, "What help does this study offer the user of tests?" The quality of the issue could be somewhat improved if standards for selecting research to be reviewed had been more clearly developed and used by the authors. This would require different standards for those studies selected for their contribution to significant theoretical issues and those selected because they furnish new generalizations useful to the practitioner who employs tests in his professional work.

Needed Research

Whether a reviewer bears responsibility for commenting on the status of research relating to a given topic or subtopic, both to characterize the comprehensiveness and distribution of current research efforts and to point out the kinds of research greatly needed to advance the field which are now lacking, is a controversial question in the total academic community. On the one hand, there are those who view the role of the critic as one who appraises the investigations that have been conducted, but is limited in his scope of review to the actual studies. He is not, according to this view, a scholar on an Olympian height whose perspective enables him to criticize gaps and omissions in research. It is further maintained that the best judgment of the research appropriately conducted at a given time is that which is underway, assuming an active body of researchers who are well informed about developments in their field. On the other hand, many scholars believe that the research underway is only partly chosen because of its importance and its relevance to advancing organized knowledge and because it falls within the competence of contemporary investigators. Other factors such as tradition, fashion, and ease of obtaining data and support account for a considerable fraction of current studies. Needed to counterbalance these influences is the criticism of reviewers who have broad perspective and will undertake the task.

In some of the chapters in this issue the authors mention needed research, but there is no consistent treatment of this subject. Because investigations of educational and psychological testing are conducted by persons coming from psychology, education, and clinical fields, and because the studies are undertaken for different theoretical and practical purposes, the resulting instruments and research plans form a heterogeneous array, and the field is like a jigsaw puzzle with two-thirds of the pieces missing. For example, in reading the chapters in this issue I was impressed by such matters as the following:

1. Most of the tests are being validated and their uses being recommended on the basis of predictive studies. Very few experimental investigations are reported in which the tests are validated by empirical data.
2. The definition of the behavior a given test is developed to measure is frequently vague, including no mention of the assumptions regarding such matters as the nature of individual functioning, the environmental interaction involved, and the social motivation anticipated, together with the means by which relevant influences are controlled.
3. Studies are commonly made of test uses without clarifying the educational purposes which they are expected to serve and without identifying the kinds of adaptation of procedures and instrumentation required for different purposes.
4. Although the very possibility of testing human behavior assumes some degree of transfer or generalization of behavior enabling the organism to cope with situations not wholly identical with those encountered earlier, very little current research seeks to identify the nature and extent of transfer or generalization characteristic of behavior measured by various tests.

Inadequacies of this sort suggest the need for focusing research efforts on these glaring omissions. Since these four observations emerged from my reading in which I was attempting to identify kinds of studies that are lacking, it is likely that reviewers who examine current investigations to identify areas that need greater attention would find significant matters to bring to the attention of the readers. Hence, under these circumstances, I would urge consideration by reviewing panels of preparing a chapter or a major subtopic in each relevant chapter discussing needed research for which current developments have made these investigations appropriate at this time. If the readers are influenced by such recommendations, it should help to make the research enterprise more productive and efficient.

In conclusion, I want to repeat the emphasis given at the start of this chapter. Because a critique is expected to identify matters that can be improved, the major thrust of this chapter is on suggestions for making a better review in the future. But I would be remiss if I did not also point out that this issue seems to me an outstanding one. It provides a picture of current research in testing which is comprehensive and knowledgeable. It furnishes some significant critical appraisals of some of the more important investigations of recent years. It is an issue that all scholars and practitioners working with tests will want to have at hand.

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Instructional Materials: Educational Media and Technology

Reviews the literature for the six-year period since the issuance of Vol. XXXII, No. 2, April 1962.

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FOREWORD

In the foreword to the 1962 issue of the REVIEW devoted to Instructional Materials: Educational Media and Technology, the cochairmen predicted that the next issue (1968) would expand beyond traditional media to report studies in the areas of computer-assisted instruction, instructional systems engineering, and a few related developments. Their predictions are essentially true, but not completely realized.

Because of the tremendous mass of experimental and quasi-experimental studies which have been reported in the years since 1962, it has become evident that a complete reporting is virtually impossible given the restrictions of time and support provided to committees and authors. As a consequence, it was decided that this issue of the REVIEW should attempt a format somewhat different from that of previous issues. Instead of organizing the literature in terms of specific media, a broader approach was taken which attempted to get at the larger issues and to organize around problem areas, cutting across media lines. In brief, the issue was planned to encompass five broad areas: the design and selection of media, utilization and management factors, learner variables, learning objective variables, and the effects of media and media systems on school organization and operation.

The success of this venture has been tempered by two problems, one a slight redundancy among chapters and the other the inability to obtain the manuscript commissioned for the final chapter, as planned originally. Since the last chapter was to have dealt with systems for learning, the application of the computer to educational problems, and the effects on the school system, all that can be referred to as substitutions are the chapter by Zinn in the December 1967 issue of the REVIEW and several recent books which elaborate on the computer in education.

It is felt that the authors did a noble job in adhering closely to their assignments. Time and an opportunity for the authors to confer with each other may have refined the process. The chairman is grateful for their efforts. Acknowledgment also is made of the assistance provided by the Educational Resources Information Center, Stanford University, Wilbur Schramm, Director.

Gerald M. Torkelson, *Chairman*
Committee on Instructional Materials:
Educational Media and Technology

CHAPTER I

Design and Selection Factors

PAUL SAETTLER

This issue of the REVIEW is the first to include a discussion of design within the context of educational media and technology. Instructional design is still an unexplored theoretical and research frontier, and at this stage in the history of instructional technology the function of an "educational designer" has yet to be clarified, let alone implemented in instructional practice beyond the most rudimentary beginnings. There are no texts or guidelines appropriate for use in designing instructional media-messages, nor do we possess a sufficient body of experimental knowledge which can provide a basis for such design.

Cooney and Allen (1964), Gagné (1965), Glaser (1966), Taylor and Williams (1966), and others have offered suggestions concerning a whole class of experimental investigations which might be fruitful in providing some scientific underpinnings for instructional design. Since experimental foundations for such design are presently lacking, however, this review will focus on selected theoretical formulations and experimental investigations which appear to pinpoint relevant factors in design. The first section is essentially a historical prologue, different in purpose from the rest of the review, to provide the reader with a contextual background for assessing contemporary media research. Because of space limitations, the remaining sections will be confined to those theoretical views or experiments which deal specifically with instructional media. This review will not, therefore, consider whatever relevant data may be derived from other fields such as social psychology, neurophysiology, mathematical engineering, computer programing, linguistics and psycholinguistics, and developmental psychology. Also, since educational objectives and learner variables are specifically dealt with in other chapters of this issue, these topics will be set aside with the understanding that it is impossible to deal adequately with instructional media-message design apart from a consideration of the learning task and the modes of learner information processing.

Background of Media Research

Saettler's (1968) historical study of instructional technology revealed a long media research tradition extending back more than half a century. Yet, despite this long tradition, media research has had little relevance to instructional design. This section will, however, review those few studies which warrant rediscovery because of their value for future research.

Hoban and Van Ormer (1950) produced the most comprehensive report of media research undertaken during the 1918-50 period, summarizing the results of more than 200 experiments on instructional films. Few other general reviews of this period have been written. McClusky (1949) analyzed the early media research, and Dale, Finn, and Hoban (1950) made a selective review of the literature to 1948.

Freeman (1924) has reported on the classic, yet generally unknown, series of experiments conducted at the University of Chicago in the early 1920's. This monumental study consisted of 13 individual experiments, representing the first systematic, experimental investigation of relevant instructional media variables and making the first use of experimentally designed media for this purpose. Since the Chicago experiments still suggest areas for further study, they warrant particular attention. A few of the major conclusions follow:

1. The relative effectiveness of verbal instruction as contrasted with the various forms of concrete or realistic material in visual media depends on the nature of the instruction to be given and the character of the learner's previous experience with objective materials.
2. The comparison of the film with other visual media (slides, stereographs, still pictures) as a means of instruction when the medium variable is motion (e.g., a film showing the motion of a steamboat was compared with a still picture of the same object) indicates that the film is superior within a restricted range and type of content, but that outside this range the other media are as effective or more effective.
3. The peculiar value of a film lies not in its generally stimulating effect, but in its ability to furnish a particular type of experience.
4. It is inefficient to put into films actions which can be demonstrated readily by the teacher.
5. In teaching science and how to do or make something, demonstration is superior to the film.
6. Films should be so designed as to furnish to the teacher otherwise inaccessible raw material for instruction but should leave the organization of the complete teaching unit largely to the teacher.
7. The teacher has been found superior to all visual media in gaining and sustaining attention.
8. Each of the so-called conventional forms of instruction which employ visual media has some advantage and some disadvantage, and there are circumstances under which each is the best form to use.

The University of Chicago experiments clearly laid the groundwork for media research by investigating relevant instructional design variables which still remain largely unexplored. In addition, these experiments anticipated current research centering on single-channel versus multiple-channel communication. Unfortunately, however, the promising research areas opened by the Chicago experiments were not developed further, and research investigators adopted a limited experimental design which has persisted to the present time.

Near the end of the first decade of media research, Weber (1930) pointed out that no further experimentation on the comparative value of media was needed and recommended that future research should be conducted to determine the optimum length and content of instructional films and to discover whether a topic in biology may be taught with the aid of a hundred feet of film, a series of lantern slides, several colored charts, and a model or two, all in addition to the traditional microscopic slides. He further recommended that the researcher study the problem of individual differences and interrelationships between animation and other psychological factors.

Weber's research recommendations went unheeded, and the next 15 years reflected mainly additional media comparison studies which produced in most cases the same monotonous result of "no significant differences." This barren era of media research did not come to an end until Hovland, Lumsdaine, and Sheffield's (1949) *Experiments on Mass Communication*. Their research report is of great historical value, containing the most comprehensive discussions concerning instructional media variables and offering fruitful suggestions for media research which has yet to be undertaken. It was also during this period that Gibson (1947) undertook a series of investigations dealing with perceptual learning and the value of films for psychological testing.

Both the Instructional Film Research Program at Pennsylvania State University and the studies conducted by the U.S. Air Force in the 1950's manipulated instructional film variables by producing experimental versions of films incorporating defined variables and then comparing their effects on appropriate groups of learners under controlled conditions. These studies demonstrated that no effective techniques had yet been discovered. Comparable studies of this type have declined appreciably in recent years.

The sheer volume of research on instructional television over the past decade has been unprecedented in the history of media research. Yet, the comprehensive report of Reid and MacLennan (1967) indicates that most of these were media comparison studies. Stickell (1963) analyzed some 250 media comparison studies of televised instruction and direct instruction and classified 217 as "uninterpretable," 23 as only "partially interpretable" because of defects in experimental design, and only 10 studies as "interpretable." All of these 10 showed no significant differences in learning at the .05 level between televised and direct instruction.

Media research reviews appeared in the April 1956 and April 1962 issues of the REVIEW. Other reviews have appeared periodically, e.g., Allen (1960), Lumsdaine (1963), Lumsdaine and May (1965), May (1965a, b; 1966), Travers (1964). Two volumes of abstracts and indexes—*Office of Education Research Reports 1956-1965, Résumés* and *Office of Education Research Reports 1956-1965, Indexes*—provide the most complete review of government-supported media research for the 1956-65 period ending in December 1965. Also, since January 1967, Educational Research Information Center (ERIC) has published abstracts in monthly issues of *Research in Education.*

The research literature reveals that the bulk of the experiments which have some relevance for media-message design were generally completed prior to the 1960's. Moreover, the total number of analytical experiments on theoretically relevant instructional variables has been small during the past 50 years. Obviously media comparison studies have predominated. In a critical analysis of this latter type of research, Knowlton (1964) observed that in most of these studies it was the addition of a medium, not the message variable, which was considered to be the variable under investigation. He noted that these studies failed to reveal any significant information about media because they were not, in fact, research on media, since their experimental designs did not provide a satisfactory method of analysis which separated the physical characteristics of the medium from sign vehicles of the message carried by the channel.

Theory and Technology of Instruction

It is obvious that a technology of machines exists, but it is also equally clear that an adequate theoretical and operational base for a science and technology of instruction does not presently exist. The curriculum reform movement and such instructional innovations as programed instruction, language laboratories, multimedia communication systems, and computer-assisted instruction all stress the need for a more systematic theory of instruction. But how, if at all, does a technology of instruction differ from a theory of instruction?

For Bruner (1966), a theory of instruction would be concerned with (a) the question of the kinds of prior experience that are most likely to predispose the learner to learn, (b) the way in which learners organize and structure knowledge for the most effective learning, and (c) a consideration of the sequence of encounters with the materials to be learned that is most likely to result in efficient learning. For Glaser (1965), on the other hand, the four aspects of a technology of instruction would involve (a) analyzing the characteristics of subject matter competence, (b) diagnosing preinstructional behavior, (c) carrying out the instructional process, and (d) measuring learning outcomes. These descriptions reflect converging concepts of a theory of instruction and a technology of instruction.

The essential difficulty in the development of a scientific technology of instruction is the serious lack of relevant theory and experimental evidence. Moreover, much of the data which may be relevant is either too fragmented or too widely dispersed throughout many disciplines. Although the task of integrating large bodies of empirical data about instruction has been started by such men as Ausubel (1967), Jahnke (1967), and Rogers (1967), nothing less than a concerted effort by behavioral scientists, teachers, media and communications specialists, and philosophers will bring the needed cross-fertilization to provide a science and technology of instruction.

Gagné (1965) proposed a taxonomy of behavioral objectives and a related taxonomy of types of learning which have implications for the selection of media for instruction. Gagné outlined eight types or categories of learning, each with its own rules, and arranged them in a hierarchy from simple to complex on the assumption that each higher order learning category depends on the mastery of the one below it. Although S-R conditioning is at the base of his hierarchy, Gagné rejects the sufficiency of conditioning. The Gagné taxonomy offers some interesting possibilities for future research.

An urgent need exists for a taxonomy of instructional media which can provide a systematic approach to the selection and use of media for educational purposes. Meredith (1965) has suggested that such a taxonomy can provide the basis for four sets of variables: (a) the physical variables in the material and form of the physical medium providing the stimulus, (b) the neuroanatomical variables in the sensory-motor structures involved in the responsive behavior of the learner, (c) the ecological variables which take account of architectural and other environmental factors responsible for the context of media, and (d) a collective set of variables which embody the time dimension, factors of memory, learning, growth, history from the past, attention, purpose, expectation, imagination, and anticipation. Fleming (1967) developed a taxonomy of instructional illustrations which included physical types (size, color, etc.), verbal modifier types (captions, etc.), educational objective types, and subject matter types.

Additional References: Bloom (1956); Gage (1963); Krathwohl, Bloom, and Masia (1964); Richmond (1967); Saettler (1967); Siegel (1967); Verduin (1967).

Design of Multimedia Instruction

A monograph by Briggs and others (1967) reviewed relevant research, dealt with shortcomings of media research, made recommendations for future research, and reported a six-step procedure for designing a media program. This procedure, which stemmed from Gagné's hierarchical model, involves a team approach in systematically matching behavioral objectives to media as well as analyzing behavior and types of learning. As a consequence, the resulting behavioral changes would generate research for the improvement of future media design and would provide some data about the nature of individual differences and learner interactions with media and teachers.

With respect to selection of media, Briggs and others proposed to seek ways "to use a single medium for the optimum length of time for the most appropriate set of objectives" and decide among the alternatives of group instruction, individualized instruction, teacher-conducted instruction, and automated instruction. The authors concluded that one must expect a more complex method of analysis with the increasing use of computers in education, but that the final solution of media selection should be based on relevant research findings and that the familiar media comparison study cannot result in improved instructional design.

Smith, Schagrin, and Poorman (1967) reported on a multimedia system used in conjunction with the Harvard Project Physics which implemented many of the objectives of the Briggs report. Answers were sought by designing, developing, field-testing, and evaluating a sequenced unit involving all media and consisting of materials produced by Project Physics in addition to programed texts and commercially available films. These experimenters reported that they designed their multimedia system with the idea of changing the traditional role of the teacher toward one of tutor and guide. They found evidence of increased instructional effectiveness, particularly in individualized instruction. They concluded that future research in multimedia systems should include investigation of teacher-student-medium interactions, use of multimedia systems in teacher education, and the development of a self-instruction teaching system using the multimedia system as a framework.

Multiple- Versus Single-Channel Research

A prevailing assumption of audiovisualists and many research investigators is that learning will be more complete as the number of cues in the learning situation increases. The most influential theoretical notion embodied within this view is that which posits a continuum of learning effectiveness extending from the real situation or the object to a progressive series of abstractions through a photograph, a model, a film, etc., to a verbal description. Thus this theory led to the practice of filling all transmission channels, especially the pictorial, with as much information as possible because almost all studies showed a combination of channels to be more effective than one channel alone.

In reviewing past experiments on the relative value of transmitting redundant information through two sensory channels rather than one, Travers (1964) could not find any study which did not exhibit serious methodological flaws, nor could he find conceptual support for the idea that a combination of two channels is more efficient in communicating information than a single channel. Moreover, he further questioned the bulk of evidence supporting multiple-channel efficiency on the basis of Broadbent's (1957) model of the perceptual system and his experimental evidence which tended to favor single-channel efficiency.

Travers and others (1966) completed a series of experiments using nonsense syllables as stimuli and concluded that there is little or no advantage to completely redundant materials in two channels, except at very high speeds when the multichannel message does not show as great an increase in errors as a single-channel message. This channel is hypothesized to contain a filter to prevent information from entering the system at a rate beyond its capacity and also a temporary short-term as well as a long-term storage system.

Severin (1967) observed that the Travers conclusion was specific to the redundant situation and stressed the use of the cue summation and the stimulus generalization principles in a method for comparative testing of multiple-channel presentations with single-channel presentations. In essence, the cue summation principle of learning theory predicts that learning is increased as the number of available cues or stimuli is increased. The other principle, stimulus generalization, would predict that information gain increases as a testing situation becomes more similar to the media presentation situation.

Conway (1967) questioned the assumptions underlying the Travers studies as well as earlier media experiments (see Hartman, 1961; Hoban and Van Ormer, 1950) and indicated that an enormous disparity has existed between experimental settings and relevant situations, that serious methodological flaws have been manifest, and that an underlying conceptual framework has been generally lacking in media research.

Additional Reference: Norberg (1966).

Approaches to a Psycholinguistics of Media

Knowlton (1964) developed a theory of pictorial communication and provided a critical analysis of media research. In an effort to develop "a metalanguage for talking about pictures," he assumed that further theoretical and experimental development required a pictorial or iconic unit of analysis as the formal basis for a taxonomy of visual-iconic signs. Knowlton's taxonomy is independent of the physical attributes of the sign vehicles categorized and requires that a visual-iconic sign "be analyzed in a way that takes account of the verbal context in which it is embedded."

Pryluck and Snow (1967) provided a conceptual analysis as the theoretical basis for the development of a psycholinguistics of cinematic communication. Since no vocabulary or syntax can presently be elaborated, they suggested that conceptual and terminological problems inherent in cine-language be partially resolved before the initiation of empirical investigation. Pryluck and Snow's analysis included the consideration of the multiple information channels available for cinematic communication, the nature of interactions between separate channels, the unique functional roles of the production features of each channel and combinations of channels, selection of appropriate units for the analysis of cinematic communication in each channel, and the specification of the syntactic structure of each channel, with particular attention to the nonverbal content of cinema. This conceptual analysis was concluded with a statement of some preliminary assumptions drawn from the field of psycholinguistics and originally presented by Miller (1965) as admonitions to psycholinguistic researchers.

McLuhan's (1964) contention, "the medium is the message," has been widely quoted and analyzed in recent years. If this statement is intended as a metaphor, then it seems clear that it expresses a fundamental truth that the medium per se is important in that different media place different restrictions on the kinds of messages they can mediate. It is important to recognize, however, that the message cannot be confused with the medium in an instructional context and that there is, at best, only a low-order correlation between message and medium. McLuhan has produced a classical lineal argument in *Understanding Media* that a medium is any item of technology (e.g., clothes, money, roads, cars, houses, weapons) which either does not communicate information or communicates information only as a peripheral function. Moreover, he exaggerates a truth about the causal relevance of media into an unqualified theory of historical change.

Additional References: Langer (1967); McLuhan (1967); Stearn (1967).

A Symbolic Interactionist Model of Human Communication

Hulett (1966a, b) provided a model of the message-generating process and described some symbolic interactionist principles which could be applied to the analysis and description of some theoretical and empirical issues in the field of human communication. This general approach was based on the view that an analysis of communication begins with what the human individual is actually doing when he encodes and transmits messages and when he receives and decodes them in a particular situation. The greatest error or deficiency in communication occurs when the intended receiver is ignored or when the communicator has wrong information or makes wrong assumptions about him. The communicator's degree of success depends on the accuracy and completeness of the information stored in his cognitive map of the environment, on his awareness of his need and ability to take the role of the receiver, and on his general efficiency and accuracy in assessing the interpersonal feedback loop so as to control the entire communication transaction.

Additional References: De Fleur (1966); Hall (1966); Smith (1966); Thayer (1967); Watzlawick, Beavin, and Jackson (1967).

Word-Picture Relationships in Media-Messages

May (1965b) reported on experiments which suggest that prefilm verbal instructions and other verbal procedures are more effective for directing and sustaining attention than built-in devices and that visual devices are more effective for cue identification. In the section of his report on perceptual responses and perceptual learning, he noted that misunderstanding of the intended meanings of spoken words and of the visuals could result in failure to learn. In other portions of this report, a large number of experiments were cited which indicated that significant differences between experimental and control groups on tests of immediate recall disappear on tests of delayed recall. In a very few experiments the reverse was reported to be true. May pointed out that a problem basic to understanding picture-word relationships in learning from audiovisual presentations is that of sensory dominance. In addition, more laboratory experiments are needed to explore the relations among sensory dominance, learning, and retention as well as the relative merits of words and pictures for attracting and holding attention. There also is a need for more analytical studies of the roles of visual and verbal symbols in media-messages.

Additional Reference: Melton (1964).

A Search for Instructional Film Design

Wagner (1966) made an approach to the design of instructional films by producing a series of four experimental films on communication theory and the new educational media. Out of this effort came a design which Wagner called "a galaxy of films"—a concept calling for the production of predesigned clips or "film-links" which would make it possible for an instructor to put together his own film without destroying either picture or sound track. Thus this film design allows the instructional message to be restructured to provide for individual instructor and student needs.

Cooney and Allen (1964) reported an exploratory study that used the film medium to examine the relative effects on learning of visual images presented nonlinearly or simultaneously and visual images presented linearly or sequentially. These experiments were conducted with sixth- and eighth-grade children, and such variables as sex, language, IQ, ability in arithmetic reasoning, and environmental conditions were considered. The results showed that the difference between the nonlinear and linear formats for the sixth-grade groups barely missed significance at the .05 level and that this difference held up well in the delayed test. Also, the mean scores for these groups favored the nonlinear format in both the immediate and delayed tests.

Additional References: Miller (1967); Smith and Smith (1966).

Relevant Research in Computer-Assisted Instruction

Few experiments have been undertaken in computer-assisted instruction which appear to be relevant to design. It is obvious that the technology of programed instruction is in disequilibrium with the technology of machines. Although the first linear models of programing were largely influenced by the theory of operant conditioning during the first stages of the contemporary programed instruction movement, it is apparent that there is much uncertainty as to what constitutes an effective program, and it is even less certain that programed instruction or computer-based instruction must inevitably be interpreted as individualized instruction.

Suppes and Groen (1967) and others at Stanford University have offered some fruitful approaches to computer-assisted instructional design. Lewis and Pask (1965) have developed a system of instruction based on the notions of cybernetics and artificially intelligent adaptive behavior. Needed are parametric studies of theoretically important variables on the effectiveness of programs.

Additional References: Briggs and Angell (1964); Briggs and Hamilton (1964); Bushnell and Allen (1967); De Cecco (1964); Holland (1965); National Society for the Study of Education (1967); Schramm (1964).

Summary and Conclusions

This review has provided a historical perspective by describing the pattern of media research during the past half century and has shown the prevailing experimental design to be the media comparison type of study. Apart from the serious methodological problems associated with much of this research, as a whole it has had only peripheral relevance to media-message design. Comprehensive theoretical and experimental bases are lacking for such design. In view of these limitations, only those theories, models, and experimental investigations which appear to suggest some basis for a technology and science of instructional message design and analysis have been selected for review.

The period under review has been distinguished by an increasing recognition of the need for a systematic, scientific approach to instructional design. What we need are criteria and procedures whereby we may match a medium to the requirements of a learner. To do this we must change the nature of our research on media-message design and develop adequate models of communication before we can hope to provide a scientific framework for the instructional designer. In the reviewer's opinion, what is needed is systematic research on the relative effectiveness of analogical and digital modes of representation as these relate to the content of the instructional message, to communicator and learner characteristics, and to the physical and psychological aspects of a particular medium or combination of media. It also is suggested that the cognitive approach (e.g., Neisser, 1967) to problems of design may offer a fruitful avenue to future research.

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CHAPTER II

Utilization and Management of Learning Resources

GERALD M. TORKELSON and JOHN P. DRISCOLL

The recent rapid expansion of audiovisual materials available to and used by the schools has been accompanied by an expanded research effort in quest of better utilization and administration of these materials. This chapter explores only selected studies related to this search since space does not permit inclusion of the great mass of literature in both areas. It is hoped that the selections offered here are indicative of trends. One notable exclusion in this chapter has been the utilization of media in teacher education, a topic well covered by the recent comprehensive summary of research by Schueler and Lesser (1967).

Utilization

A striking thing about the state of the art in 1968 as contrasted to the situation in 1962 is not merely the increase in research effort but also the haunting realization that perhaps much past research is being superseded by newer developments. Just as today's children could not be expected to react to film experiences like those tested two or three decades ago, probably as a result of visual conditioning, we must face the fact that the somewhat cyclical nature of audiovisual utilization is accompanied by strong currents of change in audiovisual research activities. Instructional television continues to be probed but seems more restricted in nature. The big leap into programed instruction about the time of the last review is now being altered by the possibilities of computer-assisted instruction. Accompanying these changes has been a small but steady stream of solid research studies in the older media, such as motion pictures, tape recordings, and pictorial materials.

Programed Instruction

By far the most difficult medium to assess has been programed learning, studies of which have been the most numerous and very often have originated in other fields such as psychology. In the last six years a number of books have appeared, supplementing the hundreds of articles with general discussions of various problems in programing and reporting a great many research findings. Glaser (1965), for instance, reviewed a large number of systemwide experiments using programed instruction and concluded that such instruction will necessarily affect (a) the immediate learning environment of the individual student, (b) the relationships between the pupil and teacher, along with classroom management, and (c) the curriculum and administration of the school itself.

The Center for Programed Instruction (1964) surveyed the use of programed instruction in some 3,000 school districts. A few of its findings indicate that (a) such use was still dependent largely on commercially made programs; (b) larger school systems tended to make earlier use, and such use was widest among secondary schools employing programs with students of average or above average intelligence; and (c) mathematics programs were most available and most widely used.

Other chapters in this issue deal with many of the experiments involving program uses in relation to program characteristics. Factors such as group versus individual pacing, machine versus programed text, the anxiety level and emotional content of programs, sequencing, and negative practice have been scientifically analyzed during the past six years. Already reviewers (e.g., Eigen, 1965) are calling for replications and deeper study of interacting variables. The much criticized initial "teaching machine revolution" is past, and in some writers' view, at least, we have recently entered the "second teaching machine revolution." Gotkin (1966), reflecting on the results of experiments with the Edison Responsive Environment (a refined "talking typewriter" based on the work of Omar Khayyam Moore) at New York Medical College, reminded us that the critical factor is still program writing. He felt that programing is overshadowed by "the psychological control that machines exert over us" and that research must point ways we can give programs "interesting personalities" and utilize programing's "unique characteristics in unique ways."

Since space prohibits consideration of the various program characteristics and their special uses, and since acceptance is a primary factor in utilization (Knowlton and Hawes, 1962), it may be wise to point up salient studies concerning attitudes toward programed instruction. Eigen (1966) found that high school students were favorably inclined toward both programs and teaching machines but that attitudes had no significant effect on achievement. Frey, Shimabukuro, and Woodruff (1967) reported, on the other hand, that achievement declined as a negative attitude toward programed instruction increased, although the error rate remained relatively constant. This implies that programed learning does have a saturation rate. And from the many studies on programing mathematics (see Lackner, 1967), we note that some researchers such as Randolph (1965) still warned against certain "boring characteristics of programed learning."

Tobias (1966) analyzed lack of knowledge and fear of automation in teacher attitudes toward programed instruction and found these factors most corrosive of both utilization and pupil achievement when terminology of a mechanistic, cybernetic, or automatic characteristic was employed. His study suggested the indiscretion of coining terms such as *educational technology*.

Language Laboratories

Media research in language teaching naturally focuses around the language laboratory, which has grown in numbers from about a half-dozen around 10 years ago to over 11,000 installations. Strangely enough, this investment has been made somewhat "on faith," for carefully controlled research on language laboratories has not been profuse. Perhaps the spread of dial-access laboratory installations will inspire some new questions. There seems to be a feeling that the hardware has outstripped theory and methods, in that most learning theory has developed apart from foreign language teaching.

In 1962 Twyford, in reviewing several studies, concluded that future research needed would be on such items as the comparative effectiveness of presentation methods and laboratory operational problems. Carroll (1963), reviewing several hundred studies on foreign language teaching, also concluded that little acceptable research had been done on how the language laboratory could really contribute to a program or even whether it could truly take over some of the drill function of the teachers. On the other hand, certain studies show the tide is turning. Birkmaier and Lange's (1967) recent review, for example, states that subsequent research does validate the intended use of the laboratory.

A number of other studies also merit attention here. Keating (1964), in experimenting with the use of the laboratory in teaching French at the college level, found that speech production significantly favored its use. An interesting secondary finding was that high IQ students were relatively disadvantaged by the laboratory. Lorge (1964) found that once-a-week use of the laboratory experiences was no better than nonuse. She also demonstrated that in speaking and listening drills the record-playback method was superior to the audioactive method. Reichard (1965) investigated using the laboratory to double the number of students taught by one instructor in an elementary German course without decreasing the quality of accomplishment but failed to obtain conclusive results.

Elsewhere in this issue of the REVIEW mention is made of attacks on the commonly accepted audiovisual premise that multichannel learning is superior to one-channel learning. Findings which might support this attack were those of Brewster (1965), who compared vocabulary learning in reading German prose and in reading German prose while simultaneously listening to tapes of the material. No significant differences resulted between groups. Anonuevo (1963) compared use of multisensory materials with conventional instruction and found no significant difference in pronunciation but a significant difference favoring the control group in intonation.

Young and Choquette (1965) studied the relative effectiveness of laboratory methods involving (a) activated headphones, (b) inactivated headphones, (c) playback after recording a practice session, and (d) short delay playback immediately after recording a single utterance. No significant differences were demonstrated in pronunciation learning. The researchers found junior high, high school, and college level students approximately equal in ability to improve via this method.

Buch (1964) also compared methods of utilizing language laboratory equipment and found no significant differences in speaking fluency or comprehension of the spoken word, but found the audioactive-record group superior in pronunciation accuracy. The researcher concluded that a combination of 80 percent audioactive equipment and 20 percent audioactive-record equipment would be desirable.

Two other developments in utilization of language teaching technology are rather arresting. Rocklyn and Moren (1962, 1966) concluded that speaking and understanding a foreign language (limited material) could be effectively taught without benefit of a human instructor provided lessons were prepared and sequenced according to principles of programed learning. They also felt that their research demonstrated the possibility of machine-teaching a full-scale foreign language course. The second development was reported by Bauer (1963), who discussed a new machine designed to facilitate improved comprehension and reproduction in the early stages of language learning. The apparatus is called the "oreille électronique" (electronic ear). In a European test, a Slavic-speaking experimental group was taught accent-free French in one quarter of the time required by the control group.

Motion Pictures

It is encouraging that quite a bit of carefully designed research still is being done in the medium of film. Utilization continues to increase at a slow rate, but a number of very interesting recent experiments point to greater practicability in the future. Webb (1964), for example, found a relationship between teachers scoring high on the *Minnesota Teacher Attitude Inventory* and frequent and intelligent film usage. Ridgway and Scannell (1962) found that no significant learning differences occurred between groups of elementary children shown a black and white educational film by rear view and by conventional projection. Roberts and Parchert (1962) found that using worksheets with films to establish clear-cut viewing aims resulted in a significant gain in favor of the group using worksheets. Utilizing a large sample from grades 3 through 6, the investigators found evidence that grade 3 was most helped by this process and that worksheets made up of objective questions were the best type.

Six years ago the 8mm educational film was only beginning to be noticed, with only very recent availability of practical 8mm sound projection. Research, however, has not kept up with the salesmen's vision, and the literature has been meager and largely hopeful rather than experimental.

The nature of some other studies is quite novel. Reminiscent of B. F. Skinner's experiments in training aggressiveness into the usually docile pigeon, Walter, Thomas, and Acker (1962) used films to increase human aggressiveness. Although their sample was small, their results were indeed dramatic, perhaps even frightening. They compared the electric shocks in time and intensity which hospital attendants were willing to give patients both before and after attendants had viewed specific films. Subjects in the experimental group who had been shown a film sequence depicting a switchblade knife fight between adolescents demonstrated significantly greater willingness to inflict pain than subjects in the control group shown an innocuous film.

The area of film characteristics in relation to film use continues to be a challenging one. A major study is that of Allen and Cooney (1964) on nonlinearity in film presentation. Results indicated that combining the film with immediate testing was superior to film use alone, that males retained subject matter best in linear format whereas females did better with nonlinear format, and that mode of presentation had less effect on the learning of older pupils than of younger.

Two other experiments provided insights into film utilization. McCoy (1962) compared black and white with color versions of a number of film sequences and tested film viewers' feelings of the "reality" of these scenes (partly staged and partly documentary). The hypothesis that color would be superior to black and white was rejected, supporting an earlier study by VanderMeer contending that audiences are less apt to notice or be affected by other cues when color film is used. VanderMeer, Morrison, and Smith (1965) contributed another study investigating the improvement of educational films by modification of structure and elements according to test results. Revisions which appreciably increased content learning were made in introductions, summaries and outlines, graphics, labels, concept of size, visual verbosity, and precision phrasing in the commentary.

Vuke (1962) compared film versions with and without inserted questions. No significant differences were obtained, confirming an earlier study by the Instructional Film Research Program. A few researchers also have wondered about the potential of inserting messages to supplement the visuals in educational films. Davis (1965) found no significant differences between groups shown versions of a film on map reading with visual and/or audio messages superimposed, but in comparing the three experimental treatments with the standard version found a difference significant at the .05 level. Davis contended that although this result was relevant for film design, quite apart from aesthetic considerations there is danger that superimposition might be perceived at the cost of film content.

Winick (1964) studied the effects of a feature film on high school audiences. Among other things, he found that less well adjusted pupils were not influenced by the film dealing with the social problem of narcotics any more than were others. Auster (1966) compared the effects of ideological (emotional) and technological (factual) film presentations by using two different films on the same subject and found that the persuasive technique in the ideological film was superior in modifying opinions.

Studies of attitude change via film have not probed the depth of this area. Levonian (1963) considered 15 research studies dealing with opinion change mediated by motion pictures and decided to investigate opinion change utilizing a film specifically tailored to its audience's characteristics. Not only did he obtain significant change, but he claimed a substantially greater attitude change than reported in any of the 15 studies. It is of interest that Levonian (1964) measured galvanic skin responses of students viewing film under conventional classroom conditions.

A study of the two controversial political films *Operation Abolition* and *Operation Correction* reported by Greenberg (1963) indicated two findings of interest to educators. As the films were opposite in intent and purpose, the study asked how seeing one or the other compared with seeing both. Results established that viewing only one of the films affected the viewers as intended by the film maker, whereas seeing both films swung the balance in favor of *Operation Correction*. The investigation also showed that persuasibility did not in this case depend on the order of presentation.

Educational Television

Among the few studies which have looked into television utilization carefully is that being completed at this writing by Chu and Schramm (1967), *Learning from Television: What Research Says*. Among the many areas treated will be a particularly useful analysis of ETV projects in developing countries.

One of the largest and best known of public school television projects has been that undertaken in Washington County, Maryland. In reporting the effectiveness of this utilization of ETV, Brish (1965) concluded that (a) pupil achievement can improve significantly when TV is used consistently, (b) TV accelerates teacher professional growth, (c) TV upgrades curriculum enrichment, (d) TV does not replace the teacher or substitute for regular class learning activities and personal teacher-pupil relationships, (e) operational costs can be met without increasing normal school budgets, (f) the problem of finding and retaining top quality teachers is eased, (g) TV changes the role of the classroom teacher to that of a team member with the studio teacher, (h) TV means greater equality of opportunity to all pupils, (i) TV increases vocational training opportunity, and (j) TV can serve adult education, community projects, and information dissemination.

Related to more than 90 percent of the ETV effectiveness studies reporting no significant differences in comparison with conventional classroom methods have been a number of studies concerning the attitudes of pupil and teacher toward the medium itself. Shepherd (1965), summarizing major findings of Oregon's Educational Television Project, concluded that family pressure to watch commercial channels may be ETV's biggest barrier, with general respondent feeling that ETV is uninteresting, formal, stiff, dull, and "not much fun." Most people paid lip service to ETV, but few watched it. ETV viewers watched more for factual information than for values and held stereotyped views of what ETV was like, "characterized by a single male figure lecturing to a camera."

Winick (1966) studied differences between viewers and nonviewers of ETV by a telephone survey of a large-city audience and reported that ETV viewers tended to be people of higher aspirations who saw the medium primarily as educational in nature.

The bulk of studies of student attitudes toward ETV has shown neutral to negative feelings. Westley and Jacobson (1963) determined that television-taught students tended to rate their textbooks and their own teachers higher than did control group students and concluded that not many teachers are threatened by ETV.

The famous Midwest Project for Airborne Television Instruction (MPATI) sponsored several utilization studies. Fritz and Massialas (1964) analyzed teacher responses to lesson series on American history and world history and concluded that teachers sensed a diminished accessibility and choice of classroom activity because of the telelesson format, and that teachers "approving" the telelessons appeared willing to continue the format of the current program despite its obvious constriction of the usual domain of the classroom teacher. Hardaway, Beymer, and Engbretson (1963) studied both pupil and teacher attitudes and concluded that (a) the overall neutral attitude toward ETV did not change significantly after a year's viewing and was generally unaffected by grade level; (b) although in-service training had some effect on attitudes toward utilization, attitudes were the same whether or not the teacher used the medium in the classroom; (c) secondary pupils tended to rate ETV somewhat according to subjects; and (d) poorer teachers, as rated by their administrators, tended to look more favorably on ETV than teachers who were rated higher.

Guba and Snyder (1965) also investigated the role of the classroom teacher using MPATI broadcasts, an attitude scale, and several acceptance and utilization inventories. Some "speculative" conclusions were that (a) the role of the classroom teacher is little affected by the introduction of instructional television under prevailing conditions; (b) patterns of utilization are stereotypic and conventional; (c) fears, anxieties, and misconceptions held by nonusing teachers disappear once experience is acquired with the medium; (d) utilization patterns nonusing teachers imagine they would employ differ considerably from those actually followed by using teachers; (e) ETV falls short of teacher expectations; (f) teachers are generally poorly trained and offered little in-service training; and (g) there are not enough receivers in the schools to use ETV properly.

For some time there seemed to be a strong need for answering the question of feedback in ETV, particularly over closed-circuit television. Following the earlier studies at Pennsylvania State University and elsewhere, other researchers have made few dents in the problem. Johnson (1962) studied the effect of feedback on the lecturer as measured by pupil achievement. No significant differences were reported between feedback and nonfeedback conditions. Woodward (1965b) compared learning of social science students having pushbutton response facilities but did not prove that concepts presented in a feedback system would be learned better than concepts presented without such benefit. Zettl (1967) worked out a classification system for television feedback with six categories: (a) direct immediate, (b) direct delayed, (c) indirect immediate, (d) indirect delayed, (e) displaced immediate, and (f) displaced delayed.

Janes and McIntyre (1965) compared achievement of undergraduates having the option of viewing instructional television in their residence halls or in large classrooms but found no significant differences. They also failed to find a correlation between attitude toward instructional television and course achievement or academic aptitude. Woodward (1965a) studied the effect of permissive attendance regulations in a televised natural science course at the college level. He found no significant difference in final grades but a negative relationship between scores for all tests and the number of absences. Ellis and Ellis (1966) surveyed student viewing of repeated telecasts and determined that 50 percent utilized the second broadcast for review and 88 percent for makeup purposes. In trying to ascertain how much a second viewing of a telelesson will increase learning, Hayman and Johnson (1963) compared language learning of fifth-graders in three varied practice situations with that of a group shown the lesson twice. They concluded that so far as language comprehension and ability to speak were concerned, repetition was very effective but not as effective as a skillfully directed classroom practice, and that its potential in increasing learning when added to classroom practice varied inversely with the experience and educational background of the particular teacher. This piece of research obviously emphasized the persistent trouble in educational research of controlling the teacher variable.

The Hayman and Johnson study was related to a larger study to determine what combinations of related activities go along with ETV for maximum learning in elementary Spanish classes. Schramm and Oberholtzer (1965, 1966) reported that an effective context for television can be built and that in the fifth grade the best combination of techniques was teacher-directed practice and electronic aids with feedback. In the sixth-grade class, teacher-directed practice, programed instruction, and a "Spanish corner"—all to be supplemented with parent participation in the home—was best. They also demonstrated that a teacher without a knowledge of Spanish could learn to manage well the combination of activities built around the television presentation and stated that "whereas teacher drill works better in small classes, individual activities like programed instruction work as well or better in large classes."

A study by Garry and Mauriello (1962) on the well known *Parlons Français* investigated the effect on pupils' listening comprehension when taught by classroom teachers trained by special television programs and those trained by tape recordings. No significant differences were found in this aspect of the study, but significant differences did obtain in a comparison of fluent and nonfluent teachers at the end of the second year of the *Parlons Français* telelessons. The teacher factor in televised language instruction was also demonstrated by Gordon, Engar, and Shupe (1963) as part of their study on teaching Russian in the elementary school in which control groups with "live" instruction surpassed the television groups in achievement.

With the shift of popular interest from television to programed instruction it was inevitable that studies would be done on the combination of the two media. Gryde (1966) reviewed such research and stated that programed instruction can be adapted to television by self-pacing, feedback, and active response by the learner. His conclusions were that (a) self-pacing could be furnished by preprograming pacing rates to homogeneous groups, (b) feedback to the student is presently complicated by television's inability to accommodate individual differences, (c) feedback to the instructor could be provided by a response system or a two-way communication system, and (d) active response tends to be best when overt response is possible, in that covert responses cannot be verified.

Gropper (1967) compared three methods of teaching science concepts to seventh-grade pupils via television while trying to determine whether, indeed, television does need active responding. He concluded that it does and that merely programing the stimulus elements of a television presentation was inadequate when students were expected to acquire, retain, and transfer several concepts and principles.

Komoski (1967) studied group-paced geography lessons televised to 17 schools in Washington, D.C., and concluded that programed television for direct instruction was an acceptable method and that it need not be limited to enrichment.

Any review of research on ETV is forced to neglect some of the numerous studies being conducted. A selection of specialized utilization studies follows as a sample of the variety of investigations undertaken in the last six years. From England, for example, a study was reported by Perraton (1967) demonstrating the effectiveness of television in correspondence teaching. Hennes and Saltzman (1966) reported that the Illinois Television Project for the gifted demonstrated that television had a real potential as an enrichment medium in astronomy, geography, and mathematics. The Chelsea Project (Langdale, 1965) in New York City showed closed-circuit television to be effective in promoting understanding between races, improving instruction in the schools, and teaching a second language to children and adults in the interest of interracial understanding.

Special Education Research

Media studies applied to special education are no longer the rarity they were. Stolurow (1966) reviewed 14 projects in the use of programed learning for the educable retarded and stated that the method was clearly feasible with retardates. Although the populations involved were small, the studies turned up some interesting results, e.g., learning can take place with symbols and a response system without the use of language, teaching machines hold a certain "play appeal," children should write the entire word rather than just a missing part, and programed units probably should be written in story form.

Malpass and others (1965) evaluated linear programing methods and the automated typewriter keyboard method for aiding retarded children to acquire and retain word recognition, spelling, and reading, using the Wyckoff Film Tutor. Results included a significant difference in favor of both media over conventional teaching, but only partial support favoring one medium over the other.

Neuhaus (1964) investigated audiovisual utilization in job training for retarded young adults with IQ's between 60 and 80. The program consisted of an individually paced audio-slide show teaching skills needed to assemble antennas in an electronic assembly plant. He concluded that skills needed to be broken down into as many independent job steps as possible, that repetition of job steps was important, and that verbal instructions were understood adequately.

Using specially produced motion pictures, Driscoll (1962) studied the film learning abilities of 402 retarded children in secondary schools. Oral and visual tests were administered. Some of the conclusions reached were these: (a) both expository and story-type films enabled subjects to learn factual material readily, (b) it was possible to change attitudes by a single film experience, (c) films as long as 30 minutes maintained interest and learning, and (d) all except the lowest ability retardates were able to generalize ideas and rules of behavior from films, although no significant correlation was found between IQ and factual learning in comparing 30 low ability and 30 high ability retardates selected randomly from the total population.

Vergason (1966) compared retardates' retention of sight vocabulary in traditional and autoinstructional teaching using the automatic slide projector. Significant differences did not occur after one day but did favor autoinstruction at the end of 1, 2, and 14 months. Vergason felt gains may have resulted from overlearning but felt further that overlearning for the educable mental retardate would seem to be most efficiently and advantageously brought about through audiovisual instruction.

Three important studies have been accomplished recently in the area of programed instruction with deaf children. Roy, Schein, and Frisina (1965) investigated the use of linear programing in teaching language development through typing. A number of other media were employed, and significant differences were obtained in favor of the experimental group. Beckmeyer (1965) compared mean gains of deaf children's reading scores when taught by programed and conventional methods. He concluded that programing is feasible as a method with deaf children, but the size and inequities of the groups cast doubt on the findings. Bornstein (1965) in comparing programed texts with the lecture method in high school mathematics for deaf children found no significant differences and no saving in time for either method.

Management

Hoban (1965) has pointed out that the central problem of education is not the teaching-learning problem but the management of learning. He also contended that the introduction of educational technology both made the problem of management of learning more acute and transformed the situation into which it was introduced. Acceptance of management of learning as a central problem, he continued, would permit the admission of alternative methods, techniques, and procedures without "threatening or substantially altering the critical functions of education, teaching, or learning."

Janowitz and Street (1966) speculated that the absence of professional practices for managing the media is likely to lead to high levels of "routinization, impersonalization, and standardization of education." Conversely, attention to the organizational settings in which media are used could result in the opposite condition. Characterizing the educational format as either standardized and informational or individualized and problem solving, they contended that the rapid introduction of media will exert pressure toward standardization, although they felt that this condition would not necessarily follow given adequate attention to the problem of administrative organization for the use of media.

A survey of the literature since 1962 in the areas of management and administration of media leads to a reiteration of the conclusions drawn by Brown and Moldstad (1962). Most studies appear to be descriptions and summaries of administrative practices, financing, organizational structures, criteria for establishing learning resources centers, and the like. There is some evidence, however, that there has been some intensive searching into the factors underlying the acceptance and management of media in education. It is the purpose of this section to sample some of these developments, admitting at the outset the limitations of many of the citations as "research studies," but suggesting on the other hand that insight for further research may be gained by such a review. For purposes of organizing relevant studies, the management problem will be arbitrarily organized into three categories: (a) identification of relationships of media to the educational enterprise, (b) organization for the use of media, and (c) development of management systems.

Identification of Relationships of Media to the Educational Enterprise

Conferences. Early in the 1960's, the U.S. Office of Education sponsored a number of conferences concerned with media. This activity continued into the middle years of the decade but seems to have tapered off as a means for influencing the actions of educational groups to apply media to instructional processes. Murphy and Hull (1967) summarized eight dissemination conferences on the uses of television among the 19 states served by the North Central Association. Later, Hull (1967) followed this report with a summary of two depth seminars which planned for a continuous census and projected the uses of television in education for the next decade.

Two conferences concerned with the economic implications of educational television were discussed by Garry (1967) and Breitenfeld (1967). The Brandeis University national conference (Garry) concluded that teachers should be prepared in the use of instructional television, that more research was needed to determine what is "good" television, and that school systems should carry the major economic burden for TV instruction.

Flory and others (1967) reported a conference at which scientists, manufacturers, and educators discussed the status of audiovisual equipment and the needs for new kinds. The rather discouraging conclusion was that American education was not able to make effective use of audiovisuals then available, considering the psychological and educational factors impeding the use of AV equipment. Cochran and others (1967) reported a conference at which 133 delegates from 33 states were involved in planning, preparing, and utilizing media for adult education. A "kit" was planned for use among adult education groups.

Considering the needs among user groups, conferences were held which explored the applications of media and instructional technology to music education (Maltzman, 1967), art education (Lanier, 1967), and mathematics (Zant, 1965). The mathematicians concluded that applications of media required a new look at the fundamental purposes of mathematics, including the "systems" approach to teaching, and that projects were needed to test materials and to provide a structure through which mathematicians and materials specialists may interact.

"Media and Educational Innovation" was the topic of a conference held late in 1963 at the University of Nebraska. Major papers were presented by representatives from anthropology, sociology, social psychology, agriculture, and education. The report of the conference included reaction papers by various experts in the media field. One might extrapolate from Meierhenry's (1966) summary that it would be fruitful to conduct research on the management of media in terms of (a) abortive attempts to establish a new practice which was never accepted; (b) the "substitution" method, in which there is the replacement of some material or hardware by a similar type without a fundamental disturbance in the system; (c) the method called "perturbation and variation," in which there is no great change in philosophy or direction but a change in emphasis due to some pressures on the system; (d) the change involving "restructuring" of basic social patterns or practices requiring the introduction of new practices; and (e) "value reorientation," the difficult change which requires adjustments in basic value systems.

Oxhandler (1965) discussed the results of a conference which brought together operations research specialists from industry and media researchers from education. The general concern was for the implications of operations research techniques for research problems in media. Of direct value to the management of learning was the general conclusion that operations research was an extremely valuable tool for use in actually forcing the formulation of educational objectives in the specific terms required for any analysis of learning and, one might add, management problems. Additional operations research applications to the management problem were suggested for financing education, identifying desirable behavioral changes in teachers, determining resource allocations, determining costs of backup personnel and facilities, and determining optimum flow patterns of media in an educational system.

A conference with a different approach was reported by Richland (1966). This involved a five-day traveling seminar by which four groups (of 30 educators each) visited four regions of the United States simultaneously to observe innovative practices in selected school systems, including the use of media, as a method of promoting innovation among the institutions represented by the participants. A four-day debriefing seminar for all groups followed the travel. Observations over the ensuing year proved the seminar to be an effective way of stimulating and facilitating educational innovation. Since the seminar identified the superintendent as an important variable in the introduction of innovations, it was urged that the regional laboratories set up by the U.S. Office of Education incorporate this consideration in their dissemination programs.

Surveys and Studies. Another method of investigating relevant variables in the management of media during this period was through the survey of existing conditions. Donley and others (1967) determined that effective ways for disseminating educational research findings were through conferences, in-service training, study teams, and consultant services. Noel and others (1967) summarized an audiovisual education study of 50 state departments of public instruction conducted in 1960-61 and a study of state laws affecting audiovisual education in 1961-62. These findings were compared with plans of five selected states for 1964-65. The general study was for purposes of assisting the U.S. Office of Education and chief state school officers in planning state activities related to media.

Schramm, Lyle, and Pool (1963) completed an in-depth study of nine representative ETV stations, using 20,000 telephone interviews and home visits with a selected subsample of about 1,600 respondents. Critical factors in the future growth of ETV were determined to be financing and programing quality. In another television study, Jaffe and Henshaw (1967) followed up an earlier three-state study of ETV in elementary school systems with a more detailed study of use in New York State, with particular emphasis on social, economic, and demographic attributes of school districts. It appeared that the presence or absence of a TV coordinator did not make any consistent difference in either utilization of or satisfaction with classroom TV and that the number of TV sets was related to the number of programs viewed regularly and to the wealth of the community. In addition, teacher shortages were not being overcome with the use of television.

Ramey (1967) surveyed television use in 88 medical schools. Forty-seven schools reported TV installations, 41 reported no use. The impression of widespread and varied use was not supported by the data. Most uses were experimental and isolated in nature.

Using a questionnaire and selected interviews, Schein and Kubis (1967) surveyed the extent of audiovisual aids and facilities in all schools and classes for the deaf in the United States. Although adequate visual aids facilities and few complaints about budget were reported, supplies of visual materials and teacher training in their use proved inadequate.

Williams and Snyder (1967) described motion picture production facilities in selected colleges and universities. It was concluded that these resources offer potential support to the production of educational, research, and scientific films but that they are largely unknown because of inefficient methods of information exchange.

One of the most comprehensive studies of audiovisual programs in the public schools was reported by Godfrey (1965). Begun in 1960 with a nationwide survey of 2,927 public school districts, it provided national estimates of the amounts of audiovisual equipment and materials available for classroom use in the spring of 1961. Levels and types of use were determined by surveying 572 schools in 247 districts. A follow-up study surveyed 238 of the original 247 districts in the winter of 1963-64. Over a three-year period, the direction and extent of change and the impact of district characteristics on change were studied. The basic sample for all studies was drawn from 2,500 school districts enrolling 150 to 24,999 pupils, stratified by region and size. A 10 percent random sample of each regional sample produced the 253 districts for the 1962 study and the 240 for the 1964 study, of which 238 participated in the follow-up survey.

Over the three-year period there was a relatively greater increase of audiovisual equipment than an increase in numbers of pupils and teachers, with the exception of the smallest school systems. The expectancy levels of equipment needs for 1961 changed by 1964. With the exception of the opaque projector, there was a consistent tendency to want more equipment per teacher. On the other hand, the thesis was not supported that the more a district spends the greater the expenditures for audiovisual equipment. Relative inventory increase was related positively to the number of schools in the system and was not deterred by the building of new schools since, in fact, the latter districts also increased their inventory of all items but radio and language laboratories. Data supported the contention that new techniques appear to be adopted most readily in "complex societies with expanding populations" and that the greatest hindrance to new media may be the small, stable district with a restricted curriculum.

Centralization and specialization in the administration of the audiovisual program was found to be positively related to inventory increases. Godfrey cited a study by Tanzman and Brown (1964), however, which showed that the amount of money spent for audiovisual equipment decreased progressively when the district had a part-time or a full-time audiovisual coordinator. This may be accounted for by the possibility that requirements were at optimum levels and coordinators were devoting their time to closing gaps in needs.

Godfrey discovered no standard or typical channels for influencing change. School boards and parents were not influential. Teacher requests, demonstrations, and observations of operating programs proved most effective. Observations were more effective in influencing use than technical reports and papers at professional meetings, although the latter had some importance. Reasons for nonadoption of a new medium were (a) more evidence of the value of the medium was needed, (b) alternative methods were as good, (c) the new medium was too expensive for what could be achieved, and (d) few teachers were trained to use the technique.

School administrators cited four criteria as bases for judging the effectiveness of audiovisual media: (a) subjective judgments of teachers, students, and supervisors; (b) observation of classroom use, often coupled with achievement testing and with few control groups; (c) teacher requests for materials and observations of teacher use; and (d) a general concern about how well audiovisual materials improve the curriculum. The data showed a "hard core" group of superintendents who considered their districts too small and poor to adopt any newer media. Godfrey concluded that unless inroads were made in these districts, the gap between the richer school districts and the poorer would become steadily greater.

A selected number of studies investigated, among other things, the attitudes of teachers toward the use of audiovisual materials and toward specific media. Knowlton and Hawes (1962) reported that 1,400 National

Science Foundation Summer Institute participants displayed negative attitudes toward conventional audiovisual materials, more as a facet of negativism toward instructionally nonrelevant conditions related to use than as a negativism toward film itself. In managing audiovisual programs, utilization barriers should be made less insurmountable through better organization and better avenues of communication.

Miller (1965), using data processing to identify barriers to audiovisual use, found 1,627 barriers encountered in 1,025 uses. The most frequent barriers in descending order were seating arrangement, screen placement, condition of equipment, electrical cords, room acoustics, lack of preparation time, operation of equipment, use of screen, focusing, and hall noise.

Evans, Smith, and Colville (1962) studied the reactions of 319 faculty members at a large Southwestern university toward instructional television. From a management point of view, it appeared that forced compliance situations tended to modify teaching by television in a favorable direction. Schenkkan and others (1967) and Sanford (1967) reported on the Texas Educational Microwave Project in which 11 institutions of higher learning were linked by microwave transmitter, producing a single closed-circuit television system reaching 11,725 students during a four-year period. Sanford reported that no general enthusiasm was felt, primarily because of the impersonal nature of television. Davis and Johnson (1966) evaluated the use of closed-circuit television (CCTV) at Michigan State University in campus and dormitory classrooms. CCTV imposed greater administrative burdens on the faculty. Ownership and control of video tapes were expected to become an issue.

Under the auspices of the National Association of Educational Broadcasters and the U.S. Office of Education, Bronson and others (1967b, c, d) reported on studies successively concerned with needs for television facilities and channel assignments, the use of computer methods in establishing locations of ultrahigh frequency television broadcasting centers (resulting in twice the number of usable channels being added to the FCC table of assignments), and technical standards for educational television. He concluded that the capability exists for higher quality picture transmission.

Davis (1967) compared the personal and organizational variables related to the adoption of educational innovations in an innovative college with one which had adopted few innovations. Conclusions were that full-time faculty and administrators did not differ significantly in awareness of educational innovation and that the noninfluentials were not significantly different from the influentials in the same group. The study only partly supported the hypothesis that organization norms in a highly innovative college are perceived as more permissive; it did, however, indicate that norms in a low innovative college are perceived as more restrictive and obligatory.

Green (1965) was concerned about ways to introduce new concepts and new ways of thinking about programed instruction into the conventional academic program. He concluded that (a) the administration must give active support to the program and reward program development, making this fact known; (b) professional groups should be established to conduct research on new techniques, train programmers, evaluate instruments and procedures; (c) a collegewide committee should recommend areas for programed instruction and should recommend individuals for research leaves; and (d) present and future developments should be reported to the faculty on a formal basis.

Metzler (1967) discussed as inhibitors to growth of educational technology in the years ahead collective negotiations in education relative to educational technology, teacher demands for extra pay for extra skills together with reduced teaching time, teacher residual rights in videotaping courses, teachers organizations' demands for certification for new positions created by the new technology, propaganda mileage to be gained by teachers insisting on computer programing, knowing that costs will inhibit adoption, disputes in budgeting for the new technology, the blocking of educational technology when security may outweigh concepts of professionalism, and the existence of "ample research" on both sides of the controversy to defend either position.

Organization for Use of Instructional Technology

Demonstrations. Demonstrations have been documented as effective procedures for accelerating the acceptance of innovative practices. Kemp and Lewis (1967) evaluated a national workshop on educational media demonstrations which resulted in kits of materials for use at local levels. The kits were judged as positively influencing teacher use of media. Kinniell and others (1967a) reported that the demonstration teams organized for intensive in-service training in the use of media in Texas did improve competency of teachers in mechanical skills and classroom uses associated with media. Block (1967) described a traveling exhibit of programed instruction and teaching machines constructed on the principles of programed instruction. Displayed at 44 locations in the United States and visited by over 100,000 people, mainly educators, the exhibit was judged favorably on a questionnaire return by a majority of viewers.

One of the more intensive types of demonstrations was Project Discovery, through which each of four school systems in 1965-66 was "saturated" with 500 films and 1,000 filmstrips, associated equipment, and room darkening, through the efforts of Encyclopaedia Britannica Films and Bell and Howell, Inc. Eboch (1966) reported the purpose to be an analysis of instructional and administrative processes, positive and negative results of the demonstration, and specifics generalizable to other settings. No premeasures were taken of teacher use of media. Teacher use of media was unrestrained. Resident observers recorded activities at each location, using checklists, questionnaires, attitude scales, and interviews.

Results showed that the total film collection was used more than three times and the filmstrip collection less than two times. The greatest problems were the lack of definitive data because of a lack of coordination among the three discrete organizations involved, a lack of accurate information in the school districts, and the problems of understaffing created by the tremendous administrative demands associated with the materials collections. On the average, each teacher used 66 films and 37 filmstrips in the course of the year. General inferences were that teachers will use materials when they are accessible and that making many materials available requires full-time administration, emphasizing the management problems associated with wide use of media.

Materials. Some examples of the need for the ready availability of materials is evident in a number of studies concluded since 1962. Faris and others (1967) surveyed selected local programs for the production of visual materials, the purpose being to assist administrators and supervisors in expanding local production. Kinniell and others (1967b) reported the development of 2,007 overhead transparency masters, field-tested by 59 classroom teachers. Bell (1967) established the feasibility of cooperative production of instructional television materials in the 12-state Great Plains area of the United States. Williams and others (1967) developed a series of self-administrative workshop packages for teachers in in-service audiovisual education. Miller and others (1966) reported the feasibility of converting regular teaching films into single-concept film clips, including an experiment in which under certain conditions film clips were as effective as a full-length film and films and film clips together proved even more effective. Wyman and Frederickson (1967) determined the availability of 91,799 locally produced overhead transparency masters and the problems related to national distribution. Wagner (1967) reported on the development of 40 motion pictures related to communications theory and the new educational media.

Equipment. It is not the purpose of this review to document changes in the instrumentation associated with instructional technology. A few studies, however, have investigated the attributes of given pieces of equipment under certain conditions. Rich (1966) reported the fact that image size influences positive reactions to Eidophor large screen television. Gotkin (1966) discussed the use of the Edison Responsive Environment (ERE) with preliterate five-year-olds from disadvantaged backgrounds. Among other things, it was predicted that the use of ERE would help to define the role of devices such as ERE and would assist in determining modifications for classroom use. In addition, such equipment would provide reproducibility of lessons as well as increased accuracy in observing learning behaviors.

Feasibility studies were conducted by Stepp (1967) to determine the effectiveness of an 8mm cartridge-load projector for teaching hard-of-hearing children and by Diamond (1965) to determine the effects of equipping seminar rooms with carefully selected equipment and materials. Both reported that continued use of the equipment was warranted.

One study which focused on specific characteristics of equipment was documented by Freeman and Buka (1965). Based on an earlier experiment which showed that frequency responses below 7,300 cycles per second (cps) and especially below 5,000 cps adversely affected the perception of a number of phonemic contrasts in German and French, the authors developed an experiment where frequencies below 50, 500, and 1,000 cps were filtered out before reaching high school students who were to distinguish 22 phonemic contrasts in German and 23 in French. In German, almost all difficult contrasts suffered from any degradation of the system. This was generally true also in French, with some internal variations. Consonants seem to have been affected more than vowels, in German more clearly than in French.

Development of Facilities. A number of studies since 1962 illustrate a concern with the creation of proper facilities and environments for the effective use of media. Leyden and Balanoff (1967) reported the development of a prototype learning center as a model for the use of media and the new educational technology. The model was based on institutional purposes and objectives as integral parts of facility planning. Tanzman and others (1967) studied the feasibility of a regional educational communications center to serve the needs of several cooperating districts. Harcleroad (1965) reported on the planning of a new library-learning resources center at California State College at Hayward and provided recommendations for colleges doing comparable planning. Bixby and others (1967) developed a study of the campus school as a potential research and dissemination center. Out of a series of conferences, Green and others (1966) developed guidelines for planning educational facilities for the use of media directed primarily to administrators, boards, institutional planners, and planning committees.

McIntyre and Haney (1967) used the case study method with selected professors from the faculty of the University of Illinois, Chicago Circle. The purposes were to identify areas of instruction where media may be applicable, to test the pattern of encouragement of faculty, to identify needed changes in curricula and methods, and to plan for the proper administration and use of the facilities and programs. They concluded that the use of faculty committees to identify critical areas of need was moderately successful, that released time for faculty for planning use of media was "absolutely essential," that media tended to be planned as a superimposition upon rather traditional curricula and methods, and that facilities and organizational structures must be planned by someone with interest, motivation, and experience.

On a topic related to organizing for the use of media, Fulton (1966) described the development of a self-evaluation instrument for judging the adequacy of media programs. Through a pilot test in 15 schools and field testing in all major geographical areas of the United States, the checklists appeared valid.

Manpower. One problem in the organization for the use of media which has not been resolved in the period since 1962 is that of manpower needs. Discussion still focuses on the necessary preparation and qualifications for professionals in the field of media and instructional technology. Most of the literature has been devoted to descriptions of everyday tasks and how to improve them. Few studies systematically tested assumptions about the importance of tasks performed.

Stanley and others (1967) developed a curriculum guide for a course in educational media research. Ely (1963) edited a major effort to define the role of audiovisuals and of related personnel in education and to supply definitions and a glossary relevant to the field of media. Bronson (1967a) surveyed personnel in educational television, gathering information on 6,000 individuals. Hall (1967) reported no agreement among 36 experts during three seminars concerned with the pre- and in-service preparation of media specialists. Cogan and others (1967) reported on papers which reviewed major career paths in the field, with categories including audiovisual specialists, school librarianship, broadcasting, and instructional technology, the latter emphasizing programed instruction and computer-guided instruction. Holtzman and VanderMeer (1965) surveyed interdisciplinary communications programs offered in 14 colleges and universities in the United States. With few exceptions, the programs made "no contributions to the solution of educational communications problems." Potential contributions were "yet to be perceived, acknowledged, and applied."

One of the more carefully controlled analyses of manpower needs in media was conducted by Martin and Stone (1967). Combining functional job analysis and critical incident techniques, the study determined that the relationships between discrete work fields are predicted to diminish as more technological changes occur, that different jobs accomplish the same tasks, and that new job titles have been identified, including technicians, research and educational specialists, educational managers, and educational communication specialists.

On a questioning note, Gerlach (1966) reviewed a number of manpower need studies and concluded that perhaps the right questions about education, and hence about audiovisual education, have not been asked. He asked whether we need media specialists; and, if so, what behaviors make them needed, what training is needed to acquire these behaviors, and who shall do the training.

Bern (1967) stressed a need for educational engineers. One step to supply the need would be to study and consult on comparable problems with such organizations as M.I.T., System Development Corporation, and the Naval Training Devices Center. The second step would be to develop courses and a curriculum which would lead to a professional degree in educational engineering.

Moldstad (1967) reported a study by Wiseman in which information from 740 public secondary schools in the North Central Association detailed current activities of audiovisual directors. An 87 percent return on questionnaires showed that the majority of the respondents were involved mainly in administrative duties with little delegation of their work to others. One may reflect that the stated need in this study for course work in administration, production, and the "tool" subjects reflects a wide gap between the actual work of audiovisual directors and the aspirations for the educational engineer as outlined by Bern.

Information Retrieval. It is the intention here not to review the extensive literature on information retrieval, but to focus on a few attempts in the media field as indicative of developments. Accessibility to various forms of information still remains a large problem.

The most widely known project is the U.S. Office of Education's Educational Resources Information Center (ERIC). As of July 1967, there were 18 ERIC Clearinghouses, one of the latest of which, located at Stanford University, focuses on educational media and technology. Prior to the establishment of the center at Stanford, much preliminary work was done at the Western Reserve Documentation Center. The activity centered on the development of semantic codes, various input and output configurations, identification and acquisition of educational research materials, and the adequacy of the abstracts and the retrieval system. One interesting test required a user group to question the index as a means of assessing its effectiveness. An additional test of the file was the comparison of the 334 abstracts on television and film research in the compendium produced by Reid and MacLennan (1967) with the index stored in the Western Reserve file. Of the 334 abstracts, 307 were found in the file, 5 of the 27 not represented had been rejected, 4 were being processed, and 9 were unpublished reports. A search of the 397 documents in the index using the semantic code of the file resulted in the identification of 236, or 77 percent, of the known relevant answers and also identified about 500 additional documents judged relevant by the staff.

Space does not permit the report of a variety of studies analyzing retrieval systems. Suffice it to say that through machine mediation the media field promises to acquire more accuracy in the retrieval of information and to provide greater service to education than ever before. Research is just beginning to determine which retrieval systems offer the greatest advantages to education.

Development of Management Systems

The final section of this review focuses on systems which attempt to expedite the management of the learning function.

Fellows and Witherspoon (1967) surveyed needs among institutions of higher learning for an educational communications system to support student record transfers, cooperative teaching, and research. The nearly 50 institutions involved welcomed electronic interconnection. Expanding on this investigation, Witherspoon (1966) reported the feasibility of the Electronic Communications System, a broad bandwidth simultaneous transmission of computer information, audio materials, slow-scan television, facsimile, teletype, and simple data services. Tests of the system were initiated at three levels: an intrastate model in Oregon, an interstate model involving the Committee on Institutional Development (Big Ten universities plus the University of Chicago), and an educational resources model in New York.

Indicative of further institutional interest, the Interuniversity Communications Council (EDUCOM) was organized in mid-1965 (Hodge, 1967). In January 1966, the first issue of *EDUCOM* was published. By October 1967, 77 institutions of higher learning were represented in the organization. The focal point was stated as the "development and application of technology to educational communication," emphasizing four categories: technological aids to instruction, technological aids to the learner, technological aids to research, and the use of technology in college and university administration.

Some of the most comprehensive studies of the use of computer simulation in identifying instructional and logistical problems in schools have been done by System Development Corporation. Cogswell and others (1967) summarized 11 analyses of school organizations in which the general procedure was to predict the effects of changes in the system. It was concluded that in order to accommodate individual differences there must be adequate study materials and adequate systems to provide information about student progress. Recommendations included continued use of computer-based systems to assist students and counselors in planning, continued study of information processing for student instruction, selective training for the development of materials, and the development of procedures for the management of changes in the schools.

Project PLAN, reported in *Educational Technology* (May 15, 1967), announced the involvement of Westinghouse, American Institute for Research in Behavioral Sciences, and 12 school districts in New York, California, Massachusetts, Pennsylvania, and West Virginia in a project for developing instructional systems, with the computer located at Palo Alto, California. At each grade level, 1 through 12, 720 students will be involved in self-instructional sequences via computer by September 1970.

It seems quite clear that a revolution in the management of learning is occurring in American education. History suggests it will be more evolutionary than revolutionary. Perhaps one can venture to predict that the time will come when most schools in the country will be organized along self-instructional lines. In the meantime, problems remain.

Silberman and Carter (1965) contended that research per se has resulted only in research reports, journal articles, and the like, but not in the development of instructional products. They proposed that the real hope is in the development of "viable well-engineered educational products." Their plan suggested objectives for education specified at an operational level by a national commission which assigns priorities in accordance with long-range survival objectives. This system would require national developmental laboratories coupled with regional research teams to adapt national materials to local needs. Teacher training would consist of apprenticeship at the regional and centralized centers, and promotion would be based on teacher effectiveness in contributing to pupil growth in the classroom rather than on credits and other traditional standards.

Bundy (1967) and Goodlad, O'Toole, and Tyler (1966) expressed optimism about computers and information systems. While Goodlad and his colleagues concluded that educational data processing (EDP) is in a rather primitive stage in education, they saw no need for further research to answer whether EDP was practical and useful. Consistent with other investigators, they felt that the problem was not the data-processing art, but rather the lack of understanding of educational purposes and of human learning characteristics. Bundy agreed that human factors were a large problem in research, but of equal importance were needs in the efficient preparation of programs, the speeding up of production time, and quality control and evaluation.

One of the most complete recent analyses of computer-assisted instruction was done by Gentile (1967). He classified problems to be solved in three categories: technical, semantic, and effectiveness. Contending that no method will eliminate individual differences, he concluded that the burden of research would be to demonstrate that adaptation to individual differences is superior to teaching to the mean of the group.

Kristy (1967) and Carter (1967) both supported remote time sharing and centralized use of computers as a way to provide more computer services to more schools. Carter further concluded that there will be greater acceptance of the technology of instruction as new generations of educators and board members become involved in education, and that computer-assisted instruction will have a greater impact on education in the next 20 years than all previous uses of the computer for accounting and such purposes. For it to become fully accepted, Carter recommended demonstrated use of CAI in school settings with regular personnel responsible for guiding its use.

Suggestions for Future Research

Against the background for this limited review of the problems associated with the utilization and management of media, several topics for further research stand out.

A critical need in utilization seems to revolve around the idea of programed instruction as a viable everyday teaching tool. The research in programing characteristics and applications is vast but lacks codification of a sort which brings the evolving theories into usable patterns for the teacher. There is also the matter of establishing the place of programed learning in the overall school program. Motion picture and television research needs to be analyzed in terms of current production and utilization data. If, for example, television is to build other than a de facto presence in the school, studies will have to go beyond teacher attitudes toward ETV and dig into teacher *needs* for its unique contribution. Research has not yet determined practical ways of involving ETV audiences sufficiently. More research into combinations of ETV, programed instruction, and computer-assisted instruction will no doubt open new avenues in this direction.

Management studies which need to be done may be grouped into several categories. Sociological studies are needed relating the community and institutional factors of the school as these influence the acceptance or rejection of media and the associated roles of faculty and administrative personnel. Also necessary are analyses of media as educational systems, including factors relating to cost and management efficiency, learner dependence on or independence of the system, and teacher roles and responsibilities. A third area related to management is a delineation of manpower requirements for the years ahead, including recommendations for different echelons of service, with related qualifications and programs of preparation. A final area for research concerns the refinement and evaluation of intra- and interstate information storage and retrieval systems and the feasibility of the wide-scale development and sharing of instructional packages.

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CHAPTER III

Learner Variables and Educational Media

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Educators long have sought ways to adapt group methods of instruction in such ways that all children in the group progress at acceptable rates and reach satisfactory levels of achievement in reasonable amounts of time. It is not surprising that group teaching methods with some fixed set of materials normally fail to achieve the purpose. In both research and classroom practice, the attempt to find ways to meet individual needs by group methods tends to encounter confusion of three important parts of the problem: (a) *criteria*—how fast and how well the learner progresses; (b) the learning *variables*—why the child progresses or does not progress; and (c) the choice among *methods* for attempting to adapt group teaching to individual needs—branching instruction, parallel sets of material, grouping by ability, or diagnostic testing and remedial instruction.

If, somehow, attention could be focused first on the learning variables—why the person does or does not meet the criteria of progress—then insights might be gained into what the individual learner needs by way of instructional materials or media. We could then consider how this need can be met in spite of the necessity for group instruction. It is thus working backwards to ask first whether one should prefer to use ability grouping or branching programs, because one cannot know whether a branching program is the proper method for adapting to individual needs before he knows what the individual needs are. Branching is not the way to meet the need, for example, if the branching is a branching by words when the learner needs a picture.

In this chapter, therefore, no solutions will be found for *methods* of making group-presented media fill individual needs because we are still uncertain as to the needs of the learner. Various lines of research endeavor, however, conducted by group experiments (not experiments with individual learners), do throw some light on the problem. Interestingly enough, it is research with groups, using samples of actual instructional materials, which helps more than the individual treatments applied to one "subject" at a time in the learning laboratory. Apparently the variables used there are not the ones needed to solve the problem. More often than not, as will be seen, this group research employed programed instruction as the medium for research.

While no one learning variable (or characteristic of the learning program) can yet be said to outweigh all others in importance, the following issues do seem worthy of exploration when searching for the key characteristics of media and materials which may eventually bring about effective individual learning in either individual or group situations: sensory mode; IQ; special aptitudes; entering competencies; sequencing of instruction; and "programing variables" such as size of step, frequency of feedback, and variety of examples.

In the following portions of this chapter, research touching on the above points is summarized. When more such research has succeeded in identifying more fully the needs for learning by the individual, then progress later may be made in methods for adapting group media to individual needs in order to achieve the criteria. If such continued research succeeds in identifying the kind of program the individual learner needs, then it may be possible at some point in the future to employ computers for highly successful branching instruction—but probably not until then.

Abilities, Prior Learning, and Sequencing of Instruction

In analyzing the task of finding formulas for "sum of *n* terms" in a number series, Gagné (1962) drew a hierarchical diagram of the subordinate skills, arranged in layers, and indicated the sequence in which the subordinate parts of the task should be taught. He theorized that the competencies so identified serve as mediators of positive transfer from lower level competencies to higher ones and that starting with the learning of the lowest levels, attaining each higher level depends on positive transfer, recall, and the effects of instruction in guiding thinking. At the very bottom of the hierarchy may be found relevant competencies supposedly learned earlier and basic abilities relevant to the learning of the task.

Gagné administered test items over each competency to ninth-grade boys. Each boy was tested first for the final task; if he failed, the test for the next lowest competency was given and so on down the hierarchy until the boy passed on a competency. At that point the testing stopped temporarily, and a learning program designed to teach the next highest competency (previously failed) was administered. Then the test items were given over the remaining levels. The results showed, first of all, that the boys exhibited wide individual differences in patterns on the tests, illustrating different entering competencies. There were no instances in which a person able to perform a higher level competency failed on a lower one. After completing the instructional portion for previously failed competencies, the boy was again tested, yielding scores on competencies both before and after administration of the learning program.

In reference to the abilities at the bottom of such hierarchies, Gagné theorized that if learning programs were of perfect effectiveness, everyone would pass all the component tests in the hierarchy, the variance would be zero, and all correlations of tests on the various competencies with basic abilities also would be zero. But if learning programs are not perfectly effective, the probability that a person will acquire each competency will be increased to the extent of his score on a test of the basic ability.

Gagné and Paradise (1961) dealt with sources of individual differences in rate of learning from a learning program. They suggested that differences in rate of learning observed among learners are due not to variations on some underlying general ability to learn fast, but rather to (a) the number and kinds of learning sets (competencies, knowledge) the learner brings to the situation, and, secondarily, to (b) his standing in respect to certain basic abilities relevant to the competencies to be acquired as they are identified in the theoretical hierarchy for the task and (c) his level of general intelligence. Reasons for failure to learn to perform a task after taking a learning program could be as follows: (a) some subordinate knowledge may have been left out of the learning program; (b) insufficient practice or some other program characteristic may have resulted in poor recall of a subordinate competency; or (c) the program may have been defective in guiding thinking required to induce the necessary integration of subordinate competencies.

Gagné and Paradise (1961, p. 3) hypothesized that a substantial amount of the variability during learning is attributable to the attainment or nonattainment of learning sets relevant to the final task the program is designed to teach. "Accordingly, as the learner progresses upwards in the hierarchy, his rate of learning should depend increasingly upon relevant abilities." In contrast, the correlation of general ability with rate of learning should remain constant as the learning progresses up the hierarchy. As contrasted to rate of achievement, the fact of achievement rather than nonachievement in a moderately ineffective learning program might depend increasingly on relevant abilities as one goes up the hierarchy, e.g., those of low ability "drop out" due to failure on some competencies while those of more ability continue to master competencies in spite of defects in the program.

The task of solving linear algebraic equations was selected to test some of the above hypotheses. A learning hierarchy was designed by a logical analysis procedure. The resulting hierarchy showed six levels of relevant competencies and, at the bottom, three specific relevant abilities.

The procedure employed in the study by Gagné and Paradise was as follows: First, basic ability tests were administered. Then the learning program was given, using eight booklets over eight class days. Then a performance test of solving equations was given, followed at once by a transfer test involving unfamiliar forms and unfamiliar symbols. On the next day, tests were given on each learning set in the hierarchy. Learning rate was recorded by having students draw a line on their program answer sheets on a signal given every three minutes.

As to overall achievement on the performance test and transfer tests, the results indicated that the program was only moderately effective.

As to transfer from learning of subordinate sets to higher ones in the hierarchy, students were scored as "pass" or "fail" on test items over each of the component capabilities. Patterns of pass-fail from lower skills to higher ones were then analyzed for each learner. The results for pairs of test items for adjacent levels in the hierarchy confirmed theoretical predictions on transfer from one competency to the next in proportions of instances ranging from 0.91 to 1.00.

On the relations between relevant abilities and learning sets, the results generally confirmed the prediction that rate of learning depends decreasingly on relevant abilities, whereas the achievement of the learning set depends increasingly on such abilities as one goes up the hierarchy. There was also evidence for the corollary assumption that since rate of learning comes to depend less on relevant basic abilities, as learning progresses up the hierarchy it does increasingly depend on achievement of successive subordinate competencies.

An implication of the findings is that as learning progresses, relevant abilities will correlate increasingly with achievement only for programs which are somewhat defective in mediating transfer from one level to the next.

Further data supporting the general theory of learning hierarchies and the implications for the sequencing of instruction were contained in reports by Gagne and others (1962, 1965) and Gagné and Bassler (1963).

Individual Differences in Rate of Learning

Because of the factors identified above in determining rate of learning, it should be apparent that just pushing the learner through the program faster is not always a good way to improve learning. On the other hand, self-pacing by the learner is also no universal cure for slow learning. Gropper and Kress (1965) presented data to suggest that self-pacing can be nonadaptive to the needs of the learner. Some learners need to be speeded up and some need to be slowed down to improve the effectiveness and efficiency of learning. If a learner-determined rate is too fast, more errors occur, primarily because of low IQ. Many high IQ learners proceed slowly and inefficiently, while many low IQ learners go fast and ineffectively. But if the pace of presentation is increased for the total group, the error rate increases, and the achievement gap between the low IQ and the high IQ learners increases. It would appear, then, that experimental study of the individual learner's pace and learning record would be one way to proceed to adjust rate appropriately for each, while analysis of errors would be a way to improve mastery of needed subordinate competencies.

Suppes (1964) has reported that in computer-assisted instruction individual differences in rate are even larger than previously thought. He cited individual differences in learning rates for drill material paced in rate by the computer. For Russian-English word pairs Suppes found that the optimum size of unit for practice was typically the largest of several units employed. Thus when lists of Russian-English words were presented in different sizes of units as an application of the whole-part question, college students and junior high school students did better practicing a list of 108 items than a list of 6 when time for mastery of the total list was the criterion. The results, of course, might not be the same if English-Russian word pairs were employed. His general rule was that when learning is faster than forgetting the experimenter should show all 108 pairs on the first trial. But when forgetting is faster than learning, only one item should be presented; all exposure of a given pair should then be contiguous. The mathematics for in-between learning rates was given.

It would appear, then, that in the future branching in rate of presentation should become a new variable in research. Many media now employed for group instruction would need eventually to be adapted and employed for individually paced instruction. This may bring more improvement in use of films, for example, than working to improve the photography. Film material should be packaged more widely in smaller segments, with responding required, to capitalize fully on the stimulus advantages of this medium.

Branching as a Means of Individualizing Instruction

Crowder (1959) introduced a variation of programed instruction first identified as a "scrambled book" and later as "intrinsic" programing when machines replaced the books. The scrambled book, unlike other books, is not read in page sequence. The learner is given a paragraph or two of information followed by a multiple-choice question. If the learner chooses the correct alternative, he is directed to a page on which he is reminded of why he is right and then directed to another page having new material and another test question. If the learner chooses the wrong answer, he is directed to a page which tells him that he is wrong, with an explanation of why he is wrong, or he is given a hint and directed back to try again. Crowder has also developed electromechanical devices for presenting intrinsic programs (see review of autoinstructional devices by Briggs, 1960). These do the "page turning" for the learner, who needs only to push the coded buttons to be told what to do next. One such device was able to present short motion picture sequences in addition to projecting pages of print. Later it was found by others that branching programs lend themselves to computerization.

Branching programs strike most people as eminently sensible. One could reasonably expect that branching programs should be superior to linear programs because they appear to provide the information the learner needs when he needs it without his being bothered by superfluous information. It is difficult, therefore, to understand why there is not more evidence showing branching to be superior to linear programs. Results from early experiments have not been especially encouraging (Campbell, 1963; Coulson and Silberman, 1961; Coulson and others, 1962; Roe, 1962). It may be that some of the early comparisons reflected the effects of inadequate techniques employed in making the decisions to branch ahead or to backtrack.

In recent years, equipment for the student station for computer-assisted instruction has been greatly improved. Early stations were limited to typewriter input and output. With the use of the cathode ray tube and light gun providing both printed and pictorial display and with the use of filmstrips, movies, and tape recorders in conjunction with the station, a greater range of instructional stimuli can be employed. Also, if accumulated historical data and series of responses made earlier in the program relevant to the next branching decision to be made can become the replacements for branching on the basis of a single test item, future results for branching programs might greatly surpass those for linear programs. Even so, it may be easier to achieve greater gains with computers for drill than for abstract, conceptual material.

In summary, early results would appear to suggest the need for basing branching on something other than the results of a single test item because of the (a) unreliability of a single item, (b) danger of failing to assess a competency in a relevant way in view of the next steps to be taken, and (c) possible adverse effects of making errors. At the present time, then, it is not entirely clear whether the somewhat disappointing results from comparison of linear with branching programs are due to inadequacy in evaluating the student's competence as a basis for branching decisions, to adverse effects of making errors, to removal of needed redundancy from branching programs, to inadequate basic programing, or to upsetting certain sequencing effects which need to remain unchanged, as in the basic linear program.

In general, improved equipment and techniques are needed in order to devise a multimedia capability which combines the response characteristics of programed instruction, the branching features of computers, and the stimulus advantages employed in film.

Size of Step

There is no standard definition of "size of step." In programed instruction it has referred variously to (a) how difficult a response is to make, (b) how large a reading segment is presented before a response is required, (c) how much progress toward the goal is represented by one frame, (d) how long it takes the learner to make a response, (e) whether or not the student responds correctly, and (f) how frequently reinforcement occurs.

At any rate, the theory of Skinner (1958) that small steps are needed, while adopted widely by linear programmers, has by no means gone unchallenged. Bruner (1963) has urged huge leaps, alternating on occasion with small steps. Scandura (1966) has questioned the relevance of learning theory as a basis for a theory of instruction and has chosen the principle rather than the S-R bond as the basic unit in meaningful learning (Scandura, 1967). Pressey (1967) objected to the fractionization of learning into small steps, preferring the larger, learner-determined, flexible size of step made possible by the technique of adjunct autoinstruction. Ausubel (1960) advocated the use of "advance organizers," introductory statements in the most general, abstract form, to serve as aids to cognitive structuring of subsequent material. Most motion pictures and television programs are apparently developed in the absence of any such concept as size of step.

Nevertheless, under a wide range of conditions, use of some form of explicit (overt or covert) responding has been shown to enhance the value of most media of instruction. Providing knowledge of results has had a similar effect, possibly more consistently for multiple-choice adjunct responding than for constructed responses (May, 1966, p. 134). This latter effect may be in part a function of size of step (difficulty of responding). New techniques are needed to permit the learner to adjust step size to his capabilities without suffering either many errors or tedious, unneeded redundancies. Recent evidence suggests that the neglected technique of adjunct autoinstruction needs wider use (Pressey, 1967).

Pictures, Spoken Words, and Printed Words

For learners who can read, few confident generalizations can be made as to whether the instructional media should display pictures, sounds, spoken words, or printed words. The review by Travers (1964) debunked the widely held notion that simultaneous visual and auditory stimuli, as in motion pictures or television, are consistently superior to one mode of sensory stimulation at a time. A more moot question is the issue of when to employ auditory and when to employ visual stimuli.

Cooper and Gaeth (1967) noted that historically the data regarding efficacy of auditory and visual materials have pointed to an interaction of modality with other factors, notably intelligence, reading ability, age, and difficulty of the material. These investigators employed five age-grade levels (grades 4, 5, 6, 10, and 12) of learners, two tasks of different degrees of meaningfulness (nonsense syllables and three-letter nouns), and two presentation modes (visual and auditory). All three main effects —grade, meaningfulness, and modality—were significant (.01 level).

Performance for nouns was best with visual presentation in the fourth grade, while the auditory presentation was best at the twelfth grade. For the nonsense syllables, the visual presentation was consistently better than the auditory (e.g., no grade by modality interaction). The reported superiority of visual presentation for nouns in grades 4, 5, and 6 and inferiority in grades 10 and 12 is directly contrary to earlier findings by Day and Beach, as reported by Cooper and Gaeth. The investigators noted that while, in general, auditory stimuli are best for easy material and visual for difficult, the best presentation for new and difficult material is a function of the habit system of the learner as developed by personal experience. They concluded that at some point in language development of the person there ceases to be a functional distinction between the effectiveness of the two modalities, i.e., a well educated adult may learn equally well by hearing or reading.

Rohwer and others (1967) presented 24 pairs of objects in the form of pictures of the objects or printed names of the objects to 96 third- and sixth-grade children. As each pair was presented, the experimenter spoke aloud one of four kinds of verbalization: (a) the names of the objects, (b) the names of the objects connected by a conjunction, (c) the names connected by a preposition, or (d) the names connected by a verb. For both older and younger subjects, pictorial materials produced more efficient learning than did the printed names, and verb connectors facilitated acquisition most, followed by prepositions, then conjunctions.

Snow, Tiffin, and Seibert (1965) reported that, while finding no main-effect difference in effectiveness between a training film and a live (lecture) presentation, among *Ss* with low prior knowledge those with an unfavorable attitude toward films learned better by live instruction. In terms of immediate recall, *Ss* characterized as active, self-assertive, self-assured, and independent learned better by live presentation. Those *Ss* characterized as passive, followers, dependent, and lacking in self-confidence learned slightly more by the film.

In a classroom situation, Westley and Severin (1965) reported (in agreement with a previous study they cited) that *Ss* seated farthest from the TV screen (up to 50 feet) learned best. Fargo and others (1967) reported mean scores on a picture vocabulary test to be no different by group TV administration than by the more time-consuming individual administration by an examiner.

James (1962) asked 503 basic airmen to express preferences for taking a lesson by reading or by lecture. A no-preference option was permitted. There were no performance differences associated with preference, but for the total sample learning by reading was superior to lecture (.05 level). Preference was unrelated to ability, but the superiority of reading was greater for high-ability airmen.

These few experiments lend little evidence arguing for increased use of auditory stimuli for the tasks and type of *Ss* employed. For high-ability

Williams (1963), employing programs as review, compared results for *Ss* of high and low aptitude. Difference in achievement for these two aptitude groups was, in descending order, constructed response, multiple-choice, emphasis, then reading. Variability in achievement was least for constructed response. She concluded that aptitude makes the greatest difference in achievement for the less active modes of responding.

Woodruff, Faltz, and Wagner (1966) reported significant correlations for ninth-graders between ability measures (IQ, average grades for seventh and eighth grades, and grades in science for these two years) and number of frames correct on a program in electricity. For fourth- and fifth-graders, they reported similar high relationships between scores on a reading test and number of correct responses on a program in spelling.

Feldman (1965) assigned 144 *Ss* of high and low verbal ability to one of three programs differing in difficulty level or to corresponding texts of reading material created from the programs by printing in the blank terms so that programs and texts would consist of identical words. Two criteria were employed: a pre- and a post-test similar to items in the programs and a transfer test of items dissimilar to program items. Verbal ability, difficulty level, and format (program or text) were found to be unrelated to gain on the cloze test. But on the transfer test, *Ss* of high ability did better than those of low ability (.01), *Ss* of low ability did better from study by text than study by program (.05), and no differences were attributed to difficulty level. There was an interaction of ability with difficulty, suggesting that "challenging" materials were most effective. The investigator concluded that responding to programs interferes with organization of the material and that well prepared charts in a text can help overcome difficult wording.

Hershberger (1964) employed typographical cueing to distinguish core from enrichment materials in written texts and "adjunct" self-evaluation test questions interspersed among pages of reading material. Different groups received different combinations of conditions: terse or discursive text, simple or complex typographical cueing, and texts without questions as well as texts with questions. High-ability *Ss* benefited from either terseness or self-evaluation test items or from both used together. Low-ability *Ss* benefited from terseness only if it was accompanied by self-evaluation test items. The test items were a mixture of multiple-choice and constructed response items. For the sample as a whole, self-evaluation questions enhanced learning and retention of core content without detracting from enrichment content. Simple typographical cueing was more effective than complex cueing. The effects of simple cueing and self-test items were independent and additive.

The above experiment on "adjunct autoinstruction" is reported in this section dealing with programed instruction since some reviewers consider the adjunct method (using test items with prose material and immediate feedback) as a type of programed instruction. Pressey, however, considers the two methods to be independent and distinct. The only direct comparisons of overall effectiveness of the two methods were reported by Pressey (1967) and by Pressey and Kinzer (1964), both finding adjunct at least as effective and much more efficient, especially for terse texts. Hershberger inserted questions after each few pages of reading, depending on the terseness of the text. Frase (1967) found effective learning for certain materials and subjects by placing multiple-choice test questions after each 120 lines of reading.

Katz (1967) reported data suggesting that when different segments of material differ in difficulty for a task requiring formation of discrimination learning sets, high IQ *Ss* gradually improve regardless of whether successive practice sessions are arranged in order of increasing, decreasing, or unchanging difficulty. For low IQ *Ss*, however, performance is best with a *consistency* of problem type and problem difficulty. And after a six-month interval the high IQ *Ss* benefit more from additional practice than do the low IQ *Ss*.

Considerable research interest recently has been exhibited, especially in England, in comparing the effects of programed instruction as used by an individual for solitary study with effects from small-group utilization of programs. Early research comparing "paired" and "individual" learning from programs used linear programs. In two studies cited by Noble (1967), pairs did better than individuals. Noble also cited a study using intrinsic programs in which individuals performed better than groups of three. Noble further indicated that teachers in England ask about group use of an expensive device for displaying intrinsic programs as a possible economy move. Noble arranged eight weeks of learning by three groups of "fourth-form students in a mixed secondary modern school." The three groups were matched on four variables: age, sex, verbal and mathematics scores, and prior knowledge of trigonometry. Mean age was 15.3 years. Control groups had one child at a machine; experimental groups had two children working at each machine. Students chose their own work mates. Results indicated less learning by the pairs, although cost economy was achieved. There was no significant attitude difference, but there was a trend in favor of working alone.

A discussion paper by Crutchfield and Covington (1966) considered creativity as a learner variable in relation to use of programed instruction. They approached the linking of creativity and programs as an apparent paradox to be resolved, since features of programs appear to be antithetical to the requirements for creativity, and offered suggestions for the improvement of programs to enhance creativity. These suggestions included (a) keep the self-pacing, self-administering feature; (b) give choice of materials and paths; (c) use diagnostic and evaluative measures to change path when needed; (d) use more flexible kinds of feedback (see Bivens, 1964); (e) generate uncommon ideas; (f) lead students to evaluate their own ideas (see Johnson, Parrott, and Stratton, 1967); (g) reward deviant responses; (h) produce reasonable amounts of study work before it is criticized; (i) use actual problems to be solved in their entirety; (j) diversify content on a given topic; and (k) use large steps to create productive tension (see Pressey, 1967).

Overview and Needed Future Research

There is current interest among some educators and researchers in discovery of the *unique patterns* which may distinguish one student's style of learning from another's. The topic of personal cognitive style was not reviewed here because of time limitations. The reviewer hazards the conjecture, based on data such as the series of studies by Gagné and his associates cited earlier, that if one were to design media to adapt media programs rigorously to the individual learner's general ability, special aptitudes, and entering competencies, most of the variance would be accounted for, as compared to such variance as may reflect those characteristics meant by cognitive style.

This review generally has not covered comparative effectiveness studies, in which the merits of one medium are compared with another or with "conventional" instruction on the basis of criterion scores for some selected experimental lesson. Criticisms and recommendations for improving this type of study have been covered in previous reviews (Lumsdaine and May, 1965; Campeau, 1967). The review has been based on the assumption that just as one medium cannot be shown best across the board or even for one subject matter area, so also one cannot show that one medium is best for one type of student. Rather, a search was made for studies in which the achievement of learners with particular characteristics was compared with learners having other characteristics when particular media were programed in well defined ways. Said differently, one does not hope to find evidence for matching a medium with a person or subject matter area; instead one seeks to consider learner characteristics while analyzing tasks with respect to the optimum kind of stimuli and learning conditions (programing strategies) which can be provided by various media (Briggs and others, 1967; Gagné, 1965).

Learner variables examined include general and special ability, past specific achievement, personality variables, and demographic characteristics. Results for learners classified by these variables were related to media or programing characteristics including pacing, branching, size of step, and modality of stimulation (audio or visual). Results were not particularly clear-cut or consistent among similar studies. For example, one can find instances where students of low verbal ability learned better by reading than by constructed response programs and other instances where the reverse was reported. Such differences can arise because of use of a variety of learning tasks, variations in how skillfully the programing is done, or differences among subjects in amount of relevant prior learning.

Nevertheless, the advent of programed instruction has provided a stimulus and a vehicle for study of such person interactions with program style. A next step would be to take some "programing variable," such as size of step, defined in any one of several possible ways, and implement variations in size of step for several media for experimental lessons representing several kinds of learning. To date, such variables as size of step are studied mainly with programed instruction, while variables such as simplicity versus embellishment are studied by films. It would be desirable to attempt experimentally to introduce the same variable in several media and then to introduce matches with learner variables. There is thus some argument for complex interaction studies to assess interaction of person variable by media by programing feature by type of learning.

On the other hand, experiments which compare achievement, under defined instructional conditions, for subgroups of learners identified as high or low IQ do fail to account for other learner variables which may be operating. Thus intensive study of selected individuals learning from a wide variety of media for many kinds of learning objectives would be advisable. One problem in applying the results of such research might be difficulty in incorporating all of the kinds of differences found into manageable media packages. In short, one may find unique sources of variance by intensive study of individuals, but one may not be able to vary media programs for each unique person characteristic.

In the previous review cycle, Silberman (1962) commented that programed instruction has not been very much adapted to individual learners. The research which has taken place during the interval should provide a starting basis for making this needed improvement in practice in all media.

Some of the variables which have been studied with programed instruction, particularly the effort to sequence instruction in accordance with explicit analyses of the learning objectives into subordinate components, as in the research by Gagné, need to be extended into work with other media. In general the procedure of task analysis, empirical tryout by sequencing studies to validate or correct the task analysis, followed by further empirical revision, is a good interim model to follow until we have more refined theories of task taxonomies, learner variables, and media variables.

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CHAPTER IV

Educational Objectives and Educational Media

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This chapter explores the relationship between educational objectives and media, i.e., the nature and extent of the contribution which media and technology have made to the achievement of given objectives. It will not be concerned with a review of comparative effectiveness studies, nor will it conclude that a large number of "no significant differences" studies give evidence that "media" reach their objectives as well as some "other" means, method, or mode of instruction.

A direct assessment of the effects of media on education is simply not feasible. When both antecedent and consequent variables are amorphous concepts, one can hardly speak with clarity and conviction about their relationship. Rather than struggle with a definition of "media"—a problem that Meredith (1965) considers so complex that some kind of taxonomy of "educational mediating systems" may be required—this chapter will be concerned with media that share certain characteristics. These characteristics permit reproducibility and control of instructional stimuli. The role of media technology in giving operational definition to educational objectives will be discussed in some detail.

The last five years of media research (1962-67) have been productive. In general they demonstrate that what media technologists "knew" five years ago with some degree of certainty is not so certain anymore. And yet, those same technologists can proceed today with more certainty in the development of educational media and "know" that it is within their capability to develop products that can be demonstrated to be more effective and efficient than present and traditional methods.

The typical manner in which objectives are stated does little to lessen, and may even increase, the difficulty of their attainment. Paulson (1967b) attempted to summarize the case against specifying instructional objectives and indicated that the majority of educational objectives are "fundamentally fraudulent," having the "capacity to deceive both those expressing them and those to whom they are expressed." Further, they may be used "both to camouflage our confusion and to propagandize the public." Yet, he concluded that any substantial and durable improvement in instruction probably would be impossible without them.

Behavioral Objectives

It appears that some educational media have had a profound influence on how educational objectives should be stated. Gagné (1965) has called attention to a relevant distinction between two major types of instructional conditions which he termed "extemporaneous design" and "predesign." Extemporaneous instruction is primarily associated with the human medium because instructional conditions are designed "on the spot" as instruction proceeds. This kind of interaction with students is considered by many teachers as one of their most important functions. In this situation specific objectives and predetermined goals seem less relevant than with less flexible media. However, many nonhuman educational media, including those with electronic, mechanical, and photochemical components, frequently employ "software" (educational materials) that must be preplanned and stored for use when required. This requirement for preplanned materials has created an ever-increasing need for a new kind of educational objective. According to Paulson (1967b) this new kind of objective should meet three criteria: (a) it is defined clearly enough so that we can recognize it; (b) we can carry out whatever activities are necessary to make it occur; and (c) we seriously intend to achieve it, even at considerable cost.

The one procedure that apparently meets these criteria involves an explicit description of the behavior of the learner in terms which make the behavior observable and measurable within the spatial and temporal context provided by the instructional situation. It is not sufficient to identify an aspiration, a dream, or a wish, and call it a behavioral objective. To qualify as a behavioral objective it must be attainable. Thus, when a behavioral objective has been identified it may be possible to develop technological media to attain it. These behavioral objectives provide the specifics necessary to evaluate whether the preplanning has been appropriate and adequate. If it has not been—i.e., if the media do not provide the means to attain the desired behavior—it is necessary to change either the objective or the media or both. Such rigid requirements have not been associated with extemporaneous instruction but appear to have been rather a correlating development with nonhuman media and the more rigid requirements of the latter for appropriate and adequate preplanning.

Much work is now being done to clarify characteristics, classifications, and criteria for behavioral objectives. Findings are not reported in typical research format but are published in the form of manuals expressing the experience of researchers in working with them. There is a remarkable consistency in findings, but also some disagreement in several unresolved issues which will require additional research and experimentation. Gerlach (1967) stated that "objectives of instruction must be definable in terms of identifiable and observable operations or products" and listed four characteristics of such behaviorally stated objectives. In essence his list of characteristics requires that such statements must (a) define a learner behavior, (b) use a verb that describes an identifiable or observable operation or product of an operation, (c) include a statement of the conditions under which the behavior is to occur, and (d) include a statement of the quality of the learner's performance or product.

Paulson (1967b) identified similar characteristics but employed different titles in a useful mnemonic device to aid in the recall of "the ABCD's of writing behavioral objectives.". His characteristics required specification of the Audience, Behavior, Conditions, and Degree (of attainment) while his definitions paralleled those of Gerlach. However, Paulson claimed that there are several more considerations in preparing such objectives because instructional systems (media) can be thought of as having three dimensions. These dimensions of media require design, development, and description. For each of these dimensions statements of objectives are of crucial importance and serve different functions. At the design level objectives give direction and focus and delimit the task. At the developmental level the function of behavioral objectives is to provide a sensitive indicator of the performance of media and to inform the developer of the nature of the strengths and weaknesses of the materials. At the description level objectives must be described in terms of behaviors actually attained and observed in realistic trials. At the latter level, the objective might be considerably revised and prepared as a rather extensive "label" as proposed by the Joint Committee on Programmed Instruction and Teaching Machines (1966a, b, c).

The verb in a sentence that describes the behavior is considered a most crucial element in preparing a behavioral objective, and considerable effort has been devoted to analyzing acceptable and nonacceptable words. Gerlach (1967) listed terms which "cover nearly all the kinds of cognitive behaviors with which teachers are concerned in elementary and secondary schools." These words are identify, name, construct, describe, and order. However, he acknowledged that lists of words in the psychomotor and effective domains might be very different. Also, there are many synonyms which are as useful as the five listed above. Gerlach and Sullivan (1967) revised and expanded the definitions of the words in an effort to make them more operational. Ammerman and Melching (1966) have made an extensive examination of the derivation, analysis, and classification of instructional objectives. Krathwohl, Bloom, and Masia (1964) have proposed a taxonomy of educational objectives for the affective domain. Little is yet available in the psychomotor domain. Other issues relating to objectives requiring resolution include (a) "time" as one of the conditions of performance, (b) implicit versus explicit statement of standards of performance, and (c) methods for obtaining acceptance and developing skill in deriving and stating objectives. The time issue is one that eventually may be resolved only in empirical data derived for each objective on the basis of student responses. It now is essentially an arbitrary matter. But there is an unresolved difference of opinion as to the necessity and means for establishing time as one of the principal "conditions" under which the stated behavior is to occur. The implicit-explicit issue relates to the degree of detail required in that portion of the statement which specifies how well the task is to be performed. No matter how complete the statement may appear, someone can nearly always raise a question which would then require some additional detailing of standard.

Some research on objectives stimulated by Bloom (1956) and summarized by Cox (1966) has been aimed at determining the best method of teaching how to identify, classify, and construct objectives. Ammerman (1966) has suggested procedures for deriving objectives in a military setting. Bialek (1967) investigated how teachers perceive objectives in terms of their importance or desirability. He reported, in part, that many teachers apparently do not feel that it is essential for certain categories of students to reach any objective at all.

Paulson (1967a) experimented with two methods for instructing teachers to construct behavioral objectives. One method utilized a "rational analysis" technique in which he analyzed the learning task, determined the prerequisite knowledge and skills, and arranged their sequence in what he considered to be a "rational order." He compared this with a "self-sequencing" technique in which teachers who were unskilled in constructing behavioral objectives could request each prerequisite section in the order desired. He found that the self-sequencing procedure did not dictate a sequence different from his own rational analysis, so he arbitrarily rearranged those sections where no clear sequential preference was indicated to produce a sequence of instruction that was maximally different. While differences approached significance favoring the latter mode, he concluded that "possible differences in performance suggest variability of performance effects with variations of sequence, rather than superiority" of the latter mode.

Analysis of Objectives

It may be that the increasing use of predesigned instructional media creates a need for techniques to specify the series of learning experiences required to produce a previously stated behavior. It also may be that some new thinking about the structure of knowledge began to channel thinking on basic factual and conceptual knowledge which serves to identify background information necessary to attain terminal objectives. Possibly these and other developments in programed instruction were interactive events. Regardless of the cause, during the past five years there has been greatly increasing awareness, interest, and activity involving the analysis of subordinate behaviors and an attempt to "design instructional systems." While these analyses are called by various names such as task analysis, hierarchical analysis, or learning-set analysis, all have the same purpose—to identify all the component behaviors that enable the student to attain the terminal objectives specified and to order them in some relationship to each other.

Task analysis in a military setting preceded present concepts of objective analysis. Cotterman (1959) and Gustafson, Honsberger, and Michelson (1960) reported analyses of training tasks, but Gagné and Paradise (1961), Gagné (1962, 1965), and Gagné and others (1962) deserve primary credit for developing procedures currently used in determining the content of predesigned media. The procedures lead to an ingenious system. Once the analysis has been completed and implemented, one of four conditions prevails: (a) If empirical tryout reveals that all subbehaviors and terminal behaviors are correctly performed, the analysis has at least been adequate. (b) If the terminal behaviors are performed but certain subbehaviors are not performed by a significant number of learners, those subbehaviors may be eliminated because they have been demonstrated to be extraneous. (c) However, if the terminal behavior cannot be performed after performing the subbehaviors, then it is concluded that the analysis has been inadequate, and additional relevant subbehaviors must be identified and performed. (d) If neither terminal behavior nor subbehaviors are performed, then further analysis of subbehaviors is necessary until they can be performed. The procedures would appear to be invaluable to those who design and produce educational media.

Despite the apparent effectiveness of such an approach, there is a great need for systematic procedures to specify the nature of learning experiences that will be required to produce a previously stated behavior. For example, Gagné (1965) has identified eight different types of learning tasks (signal learning, stimulus-response learning, chaining, verbal associations, multiple discrimination, concept learning, principle learning, and problem solving). These learning tasks differ in important ways and require different instructional conditions. Thus, if enough were known to allow classification of each behavioral objective, ultimately it might be possible to specify the stimulus properties that would attain that kind of objective. Unfortunately, present knowledge is insufficient to enable systematic linking of objective to required stimulus properties for various kinds of learners.

Several researchers, however, have proposed either components or total "systems" to analyze and order objectives into a predesigned instructional "package." Glaser (1966) identified four components of instructional design and emphasized preinstructional variables which he stated "are determinants of the nature of instruction." Briggs and others (1967), Gerlach and others (1966), Gilpin (1962), and Smith (1966) made extensive and specific proposals for procedures to analyze objectives and design instructional systems.

Additional References: Eckstrand (1964); Eraut (1967); Miller (1963).

Media and Learner Responses

In order to establish a relationship between two objects such as educational media and educational objectives it is necessary to make both objects specific. When media are identified as the various means to attain given educational objectives then it is clear that the basic topic is instruction—because it is through instruction that educational objectives are attained. Instruction, however, is a kind of nonspecific object that embraces all means to a given goal. In order to make instruction specific it must be made operational in some replicable form. When the stimuli of instruction are committed to film, print, video tape, audio tape, or other technological media, then the means of instruction become fixed and replicable. Thus some media do make instruction specific and permit the determination of a relationship to specific learner behaviors.

The desired relationship between a given medium and an objective is one of congruence. The medium should be the "best fit" possible—a concinnity of all stimuli essential to the attainment of an objective. Such a relationship, however, is difficult to achieve. The best solution to date has been to utilize learner responses to eliminate superfluous stimuli. While this procedure may do little to enhance creative elements in instruction, it does eliminate the most debilitating components of whatever has been created. This empirical "tryout" with learners to obtain their responses to each element in a specific instructional "package" is becoming increasingly essential in technological media development.

Methods of Utilizing Learner Responses

Five different approaches currently are being tried. The error-rate approach is associated with early developments in programed instruction. The basic concept is to conduct a field test of the materials being developed, collect responses to each frame or item, and then analyze and modify those items in which the desired response is not obtained with a high degree of consistency. This approach generally tends to result only in changes to those items where high error rates are found (usually above 10 percent). It does not tend to shorten programs appreciably or to identify those subtle changes required for maximum refinement of materials. But it has proved to be a relatively economical means to produce a product that "works."

The counseling approach utilizes an interview technique with individuals in small groups (fewer than five). While the learner is highly aware of the fact that he is making a contribution to the development of materials, the developer avoids leading the learner, i.e., the developer does not solicit hypercritical comments or invite opinions as to how an item should be revised. Yet, the learner knows that when he does make an error, the developer is going to use that error as information, together with any candid comment the learner might make, to modify the materials being developed. This approach provides a continuing opportunity for revision but does not provide a parallel context to use the materials in a later, noncounseling situation. Data from this approach are likely to differ materially from error-rate data.

The diagnostic-criterion test approach employs concepts identified in task or learning-set analysis. The criterion-type test attempts to measure only criterion behavior. The diagnostic-criterion test adds to the criterion test in an attempt to measure the degree of attainment of all subbehaviors in a learning hierarchy. In this approach entire sections may be deleted or reworked. Other sections may produce high error rates on diagnostic test items, but they also may produce high scores on the criterion test. There is some evidence to indicate that occasionally a difficult item (when in the context of low error-rate items) will be retained as well as low error-rate material. If a high error-rate item produces desired performance on a criterion test, then the diagnostic-criterion test approach would utilize that information rather than negatively modify an item that was effective—even though it did not possess a theoretically desirable characteristic.

The latency approach utilizes findings of Briggs, Campbell, and Brooks (1964) which indicated that delay in responding to items was an effective means for identifying item deficiency. Low error rate alone has been shown to be a rather poor indicator of the quality of an item. When latency of response is added to the developer's data he is provided with a sensitive index of the items on which the learner is experiencing difficulty and items not making a sufficient contribution to the terminal behavior. Obtaining latency data, however, requires instrumentation and a sophistication of methodology that complicates field test procedures. Yet, it appears likely that latency data will add another significant dimension in the search for methods to obtain and use learner responses to produce media that will most effectively attain a given objective.

Recently Holland (1967) has proposed a "black-out rate" approach to eliminate extraneous stimuli. This simply required covering over (with black crayon or ink) all stimuli in a given item not demonstrated to be essential in producing the desired response. If too many or inappropriate stimuli were blacked out the error rate would rise, and thereby the developer was provided a useful guide with which to determine how much material could be deleted without reducing the contribution of the item to the terminal behavior. Holland has demonstrated that considerably more than 50 percent of existing programs may be blacked out and the error rate not affected significantly. Although this procedure may produce a product that is unacceptable to those curriculum experts who have a preconception of what instructional materials should look like, the evidence remains that learning is achieved.

Which of the suggested approaches, what combinations of them, or what new approaches are needed to produce the optimum product is unknown at the present time. It may develop that eventually different approaches will be utilized for different objectives that require different classes of stimuli for attainment. There is abundant evidence, however, to document the fact that when learner responses are utilized to modify media, those media achieve specified objectives more effectively than they did in their original version. Gropper, Lumsdaine, and Shipman (1961) and Carpenter and Greenhill (1963) found that materials used on television were significantly improved by modifications based on initial learner responses. VanderMeer and Thorne (1964), VanderMeer (1964), and VanderMeer and Montgomery (1964) repeatedly demonstrated that filmstrips were improved as the result of using learner responses in subsequent modification. VanderMeer, Morrison, and Smith (1965) demonstrated comparable results in improving effectiveness of motion pictures when modified on learner response data.

Teacher Roles

Large expenditures will be required to develop adequately specific behavioral objectives, perform the detailed analyses required, and empirically refine prototype materials until they are demonstrated to be effective, especially when there are so many objectives in education. Unless costs can be amortized over many learners it may not be feasible to expend the amounts required, with present techniques, to establish the desired congruence between objectives and media. However, media make possible the presentation of refined materials to unlimited numbers of learners. This raises an interesting related issue. Should the teacher's role be to identify the desired behavior for a given learner and then select the appropriate prepared learning experience, considering cost, priority, potentialities, etc., or is it inappropriate and beyond the teacher's response capability to plan instruction for each learner? If it is, then teachers might be required merely to keep themselves advised of a student's progress and select ordered experiences knowing that they would attain predetermined goals. Ongoing research at the University of Pittsburgh Research and Development Center on individually prescribed instruction and at the System Development Corporation on instructional management systems constitute major present attempts to clarify teacher roles with media-based instructional systems.

Additional References: Levonian (1960); Lumsdaine (1961); McCrystal and Jacobs (1966); Melching and Nelson (1966); Paulson (1964); Silberman and Coulson (1964); Smith and Smith (1966).

Instructional Strategies

When the sole purpose of instruction is to assist the learner in acquiring certain kinds of behavior, the question of the most effective instructional strategy becomes imperative. Strategy relates to the type, quantity, and sequence of instructional stimuli. Additional research is needed on such unresolved issues as, for example, the effectiveness of inductive and deductive procedures for varying objectives and learners; the relationship between rules and examples; the appropriate time to employ programed, directed discovery, and discovery techniques; the unit of instruction; the latency and form of feedback; the frequency of review and repetition; the variety of stimuli required to maintain interest and provide for transfer; the use of single or multiple modalities; and varying strategies required for the cognitive, affective, and psychomotor domains.

Unquestionably, many of these issues are very complex, and strategies appropriate for a given objective, a given situational context, and a learner of given characteristics will be inappropriate if any single interacting variable is modified. Edling (1966) has proposed a structure for systematically relating stimulus, response, situation, and learner variables into a computer-based information storage and retrieval system that might, in time, help to order the complex issues involved.

Issues and Evidence

The issues relating to the use of rules (abstractions and principles) and examples (instances or special cases of those principles) whether they be complete or incomplete (learner required to complete an example or solve a specific problem) are now partially defined but not resolved. Closely related to the rules-example question is that of the appropriate times to employ inductive and deductive methods and programed as contrasted to discovery techniques. Twelker (1965) found no differences among high school students taught a cryptography task whether both rules and examples were given, whether either rules or examples were given and either the accompanying examples or rules were complete or incomplete, or whether neither rules nor examples were complete. He did find, however, that a control group that received no instruction scored significantly higher on a transfer task than did any other group. Kersh (1964) found that discovery techniques requiring learners to ascertain principles from examples independently of the teacher before the teacher verbalized the rules were less effective than when the teacher verbalized principles first and then learners practiced examples.

Another type of information required by learners relates to feedback. Stake and Sjögren (1964) experimented with various "levels" of learner activity. They found that programed materials were consistently more effective than the reading of conventional materials and that making written responses facilitated learning. But this superiority was not found when using "rudimentary teaching machines." Gropper and Kress (1965) in using television to "group-pace" programed materials reported that latency of feedback was "not as critical as commonly believed." They found that two rates of pacing were sufficient to accommodate the requirements of individualization for a relatively heterogeneous group.

The amount or quantity of information presented between feedback intervals has proved to be a difficult area to research. Large versus small steps constituted a popular research area in programed instruction prior to the current review period, but definitions and findings were inconsistent. An attempt was made to identify and teach whole or natural units as contrasted to parts of a unit. Smith (1964) devised an experiment utilizing individual frames, sequences, and the whole unit. He found that on immediate tests of retention, feedback after each frame was significantly better than feedback after either a sequence or a whole unit. Differences were not significant on a delayed test three weeks later. The sequence method was reported superior to the frame method in facilitating retention of information.

Learning Modalities

Issues related to learning modalities and their sequencing in instruction appear to be making a rather substantial contribution to the development of instructional strategies. Questions in this area relate to the ordering of sensory displays. A major finding reported by Travers (1964) may signal the start of a new direction for media research. He presented evidence to indicate that "man behaves in many ways as if his capacity for storing information was very limited." He concluded that learners could generally utilize information from only one source at a time and that attempting to flood the learner's sensory modalities with information and stressing realism was likely to provide a poor learning situation.

A year earlier, Allen and Cooney (1963) studied the amount of information the visual channel could accommodate. Their study compared the effectiveness of films in which visual images were presented linearly (separately and sequentially) with those presented nonlinearly (cumulatively and simultaneously) at different levels of abstraction. Sex and age inconsistencies and differences were reported, but there were conditions where the nonlinearity format was found superior on both immediate and delayed tests of retention. This finding suggests that while the learner may attend primarily to one sensory channel at a time, the amount of information that a single channel can process may be considerable. Further evidence on this point was contributed by Guba and Wolf (1964). In utilizing televisions and ophthalmograph principles to study eye movements they found that some learners could indeed scan a great quantity of information in a short time. They found that a "remarkable relationship" existed between eye movements and intelligence. Learners with low intelligence scanned little of the visual displays presented to them.

Several studies were reported that support and expand on the general strategy of presenting information to one modality at a time. Smith (1967) found that graphic materials alone were more effective than words alone or words added to graphics in contexts of either simultaneous or successive presentation. Gropper (1966) recommended using a single concept visual followed by verbal explanations for maximum instructional effects. Asher (1961), in a comparison of visual and auditory learning of Spanish, found visual learning followed by aural relearning to be significantly more effective than aural learning. However, his subjects were adults, and the reverse approach (audio-lingual) has been reported superior for language learning in children. Scherer (1963) compared the audio-lingual and conventional grammar-reading approach in teaching German. After the first year the audio-lingual approach was found superior in teaching listening and speaking, but it was less effective in teaching reading, writing, and translation. After two years the audio-lingual method was still better in teaching speaking but poorer in teaching writing and German-to-English translation. There were no significant differences in listening, reading, or English-to-German translation with either approach after two years. The complexity of the issue is further attested to by Chan, Travers, and Van Mondfrans (1965), who found that even a color-embellished visual presentation disrupted learning on the audio channel more than did a black and white visual presentation.

Learning Domains

Both instructional strategies and measurement methodologies appear to differ among the so-called domains or varying classes of learning—cognitive, affective, and psychomotor. Developments in cognitive learning were well summarized by Klausmeier and others (in press) and by Klausmeier and Harris (1966). A useful taxonomy and proposed strategies to attain objectives in each classification appear to be emerging in this area, but empirical validating studies are yet to be designed and implemented. In the affective domain there is no comparable summary. Merrill (1962), Edling (1963), Levonian (1963), and Sullivan (1964) reported studies employing motion pictures to modify attitudes and opinions. There is a developing consensus that knowledge of learners' existing attitudes and values is crucial in the design of strategies to attain objectives in the affective domain. Also a strategy matter in this area is the perceived information source. Kraus (1962) reported a previously unexplored factor, the race of the communicator, as a significant variable in message design. In a prejudice-modifying task he found that a mixed race information source had greater effects than a single race serving as the information source. Measurement problems appear to be more complex in the affective domain, and Edling (1963) reported that pretesting in this domain had the opposite effect of pretesting in the cognitive domain. Post-test scores in the affective domain were depressed, whereas pretesting typically enhanced post-test scores in the cognitive domain. Smith and Clifton (1961) attempted to determine whether a learner's perception of his performance was changed through the process of the learner viewing motion pictures of himself performing various psychomotor skills. They reported significant differences in learners' perceptions after viewing themselves but also reported sex and task interactions. There is some ongoing research in the psychomotor domain using the video-tape recorder. Because of the recorder's potentialities, the next review period probably will reflect increasing activity on this topic.

Additional References: Beaird and Standish (1964); Hayes (1965); Payne, Krathwohl, and Gordon (1967); Rowlett (1962).

Media and Measurement

Media have made some significant contributions to the measurement of complex human behavior. Existing paper and pencil tests, which rely heavily on symbolic stimuli, rarely account for more than half of the variance in a criterion involving complex behavior. Cronbach (1960) has documented this in the case of academic achievement in college; Mitzel (1960) has documented it in predicting performance in public school teaching; and innumerable confirming studies were reported by Buros (1965). Apparently, traditional test methods and materials relate only to a relatively few of the many complex factors that influence human behaviors, and they do not employ the kind of stimuli required to elicit behaviors that correspond to the complex criterion behaviors typically employed in validation.

Schalock, Beaird, and Simmons (1964) hypothesized that "if prediction of complex human behavior is to occur, these test stimuli must reflect the complexity of the situation that elicits behavior to be predicted," and that "words and/or symbols cannot realistically reflect such complexity." These authors also posit that tests which utilize stimuli corresponding closely to actual situations should prove to be more effective predictors because simultaneously they will (a) call forth responses that are more like those occurring in a life situation and (b) make available for measurement a greater number of the factors affecting complex behavior.

Motion pictures and television have been employed as media to present more complex and lifelike stimuli in test situations. Results have shown dramatic improvements over traditional methods in measuring complex behavior. Yet, it is obvious that improvement in measurement methodology depends on more than the adequacy of test stimuli. Research design considerations, development of appropriate external behavioral criteria, and development of useful theoretical constructs all are essential in improving measurement instruments and procedures. Nevertheless, the contributions of motion pictures, kinescopes, and video tape in providing more complex and realistic stimuli are substantial. They open new potentialities for research and development in the measurement of educational objectives.

Seibert and Snow (1965) have recently and so well reviewed developments utilizing motion pictures in psychological testing that it seems unnecessary to review this same material again, with the exception of the extensive investigation by Schalock, Beaird, and Simmons (1964). This study hypothesized that the predictive power of tests would increase as test stimuli increased in their representativeness of behavior to be predicted. For four levels of "representativeness" and 15 separate criterion measures, each actually involving concrete classroom teaching behavior, the evidence supported the basic hypothesis that the predictive ability of tests could be ordered in terms of their stimulus and response complexity. However, an additional finding was that the less complex stimuli contributed to variance not measured by the complex stimuli. It was concluded that predictive batteries rather than single predictors should be employed when the criterion is some form of complex human interactive behavior. When the most effective predictor subscales of each instrument were combined to predict each criterion behavior, at least 50 percent of the variance was accounted for in each of the 15 separate criterion measures, and as much as 75 percent was accounted for in some (r's = 0.71 to 0.87).

Other difficult to measure educational objectives have been measured by film tests. Levonian (1962) employed motion pictures in opinion measurement. Motion pictures also have been used extensively in assessing complex psychomotor skills such as those involved in driver training. Ongoing research, not yet formally reported, suggests that film, kinescope, and video-tape testing procedures have potentialities which should be investigated in all academic areas.

Additional Reference: Curtis and Kropp (1962).

Summary

This chapter reviewed research related to contributions that various educational media have made to the achievement of educational objectives. There is little evidence to support the concept that given media, qua media, contribute to more or better learning than other media; i.e., there is no evidence as to what, or how much, is learned in "nonmedia" situations. But there is considerable evidence to indicate that research and development activities involving media have (a) helped clarify educational objectives, (b) contributed to the analysis and design of media that produce the specific learner behaviors identified, (c) utilized learner responses to refine and develop more predictable learning experiences, (d) clarified the need for specific instructional strategies to attain given objectives, and (e) provided new potentialities to determine whether or not educational objectives have been attained.

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REVIEW OF EDUCATIONAL RESEARCH

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International Development Education

Reviews the literature for the six-year period
since the issuance of Vol. XXXII, No. 3, June 1962

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FOREWORD

This issue of the REVIEW inaugurates a new organizational topic not covered as such by previous issues or chapters. Professional educators in the United States only recently have begun to undertake serious and intensive international research endeavors, though many long have participated in service-oriented development education projects abroad, and a few have been identified with comparative cross-national studies of education.

Some of the current research represents cross-disciplinary effort which has helped to bring professional educators together with their university colleagues in the social sciences. Interdisciplinary cooperation is especially necessary when one wishes to understand the effect of social influences on education as well as the contributions of education to social change and development in a worldwide context.

Developing the structure of this report has been an exciting exercise in defining a field which none of us recognized as such 10 years ago. We have approached structuring this issue with some trepidation knowing that there are many points of view among our colleagues as to terminology and definitions. To widen the opportunity for participation in this first taxonomy of international development education, if we can be allowed to call our table of contents a taxonomy, a questionnaire was prepared and circulated to the REVIEW's international contributing editors and to over 200 of our professional colleagues throughout the world. It asked for reactions to some preliminary definitions of the field and solicited assistance in delineating important and relevant research. We are most indebted to the many colleagues who responded in depth to the questionnaire. Our original intention to acknowledge substantial responses by name was precluded by the large number of responses received. Therefore, we must thank them collectively with this acknowledgment.

We have not included a general chapter on Comparative Education because of the recent appearance of such a chapter in the February 1968 issue of the REVIEW. Although a number of comparative studies are herein reviewed, they have been chosen in the context of their contribution to the understanding of education in relation to specific aspects of national development.

Seth Spaulding, *Chairman*
John Singleton, *Cochairman*
Committee on International
Development Education

CHAPTER I

The Context of International Development Education

SETH SPAULDING, JOHN SINGLETON, and PAUL WATSON*

Within the last decade, a number of international concerns in education have begun to gather around the somewhat ambiguous slogan of "international development." First given substance by the U.S. government's foreign assistance programs, the terminology was ultimately, in 1961, incorporated in the name of the government agency charged with overseas assistance programs, the Agency for International Development (AID).

The foreign assistance programs of the U.S. government have actively enlisted university and college faculty members to direct and participate in their overseas programs since President Truman proclaimed the Point Four doctrine in 1949. As a natural but delayed outgrowth of this activity, there has been an increasing scholarly concern for understanding the processes of social change and development planning by those who participated in the overseas service enterprises.

Practical overseas experience led many scholars to the realization that applications of professional expertise and knowledge in the cross-cultural context of the developing world require a basic re-examination of the premises of our academic professions and disciplines. For this reason, we now have increasingly recognized subdisciplines of development economics, development administration, and development politics.

Though educators have been involved in overseas assistance from the beginning, economists and public administrators took an early lead in substantial development-related research enterprises. They were the most prominent original founders, too, of the Society for International Development, which is an important professional organization uniting researchers and practitioners in this area from different academic disciplines and professions.

The Role of Professional Education

University Centers for International Development Education

Since 1960, several major U.S. schools of education have established centers or departments concerned with the field of international development education. While often connected with the previous international concerns of professional educators subsumed under such titles as comparative education and international education, the new centers of what we here call international development education generally have been equally influenced by the development subfields of social science disciplines.

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*Ronald Wheeler, graduate research assistant at the University of Pittsburgh, was especially helpful to the Committee in the preparation of this chapter and this issue.

The most obvious sign of this interaction is the acceptance by some professional education researchers of the concept of "development education" when referring to educational programs and problems relating to national planning and economic, political, or social change. It is an analogy to such fields as development economics and challenges the prior claims of educational psychologists to their exclusive use of the term *development* in the very different context of individual growth and development.

A recent report of Education and World Affairs (1967) described the current organizational status of concern for world affairs in professional schools of education. While making a general argument that all faculty of schools of education should be encouraged to view their subject matter in a comparative or cross-cultural perspective, the report described six major research and training programs specializing in international development education. These are at Stanford (Stanford International Development Education Center); Teachers College, Columbia (International Studies); Chicago (Center for Comparative Education); Harvard (Center for Studies in Education and Development); Pittsburgh (International and Development Education Program); and Syracuse (Center for Development Education). Other U.S. centers of research activity in this area are located at Michigan State, Wisconsin, Indiana, Ohio State, California (Los Angeles and Berkeley), and a few other universities.

At Stanford, professors of economics, anthropology, and political science have been recruited to work with professional educators as a multidisciplinary team dealing directly with the relation of educational content and curriculum to development (Hanna, 1962; Hanna and others, 1964). Chicago and Syracuse have stressed economics and sociology as core disciplines for understanding the role of educational institutions in national development (Adams and Farrell, 1966; Anderson and Bowman, 1965; Foster, 1963). Columbia has developed a variety of international development education approaches that include social science oriented regional studies in education, international relations in education as a cross-professional collaboration between international affairs and education, and international educational development which focuses on the strengthening of educational systems and organizations from an applied social science perspective (Butts, 1963). The Harvard Center has been very much concerned with the integration of economic and educational planning (Beeby, 1966; Curle, 1963), while Pittsburgh has emphasized educational methods, techniques, and strategies for development (Spaulding, 1967) along with applied social science perspectives (Singleton, 1967). Indicative of a division in the social sciences, anthropologists have been active in the centers at Stanford, Columbia, and Pittsburgh, while sociologists play important roles at Chicago and Syracuse.

Common concerns which distinguish the research endeavors of these centers from past research in comparative and international education have included (a) the need for a more sophisticated research literature to support educational policy and planning decisions in the developing nations; (b) the need to improve the quality, effectiveness, and economy of external assistance in educational development efforts around the world; (c) the need to examine educational methods, techniques, and strategies that might be uniquely significant in the context of emerging nations; (d) the need to prepare professional "overseasmen" educators for international assistance efforts; and (e) the need to better program educational activities in the more developed nations for students from overseas who are being prepared for professional contributions to the development of their home nations.

Additional References: Cerych (1965); Coombs and Bigelow (1965); Frankel (1965); U.S. Department of State (1967).

Nature of International Development Education

The U.S. centers described above do not subscribe to a common label for their similar enterprises. The terms *comparative, international,* and *development* are all used in one form or another in each of the organizational titles.

For the purposes of this review, however, *international development education* is described as the field concerned with organized programs of teaching and learning within the context of planning for economic, social, or political change in the newly developing regions of the world. It is the study of the time, place, and kind of educational interventions appropriate within specific cultural contexts. It utilizes the substance and methods of the social sciences and social professions and assumes the relevance of educational organizations and strategies to both individual and national development.

Researchers in this field, whether or not they identify with international development, have made common cause with those economists, political scientists, public administrators, anthropologists, psychologists, and sociologists who have taken a special theoretical interest in the processes of national development.

The concept of international development education does not necessarily imply that there is some special kind of education which leads to development. Rather, education is viewed as potentially instrumental in development.

On the other hand, comparative education is described in its traditional sense of studies of foreign educational systems, historical and contemporary juxtaposition of educationally relevant data and cross-national comparisons (Bereday, 1967; Halls, 1967). Comparative education generally has been associated with historians and philosophers of education.

International education, sometimes combined by others with comparative education (Butts, 1967; Fraser, 1967), is seen here as the field concerned with cross-national relations and cooperation and exchanges of educational information and personnel. The three major areas of interest associated with international education are international relations and cooperation in education; cross-national movements of educational materials, students, teachers, consultants, and aid; and education for international and cross-cultural understanding. A recent report by Michie (1967) on a symposium held on the twentieth anniversary of the Fulbright Program, for instance, dealt with international education as primarily programs for exchange of people.

King (1967) argued that the interests of international development education are the most recent developmental phase of comparative education. Bereday (1967), however, distinguished among the three fields, suggesting as a rule of thumb that comparative education is concerned with statics and development education with dynamics. He described development education as concerned "with modes of action or making educational policy more intelligent and immediate." Development education is then distinguished from international education by its concerns for the interrelationships of schools and other social institutions, whereas international education stresses the interaction of cultures and countries.

Development education, apart from its international context, has an obvious close relationship to investigations of current U.S. educational innovations designed for the economic and social development of our urban ghettos and rural enclaves of poverty.

Additional Reference: International Institute of Administrative Sciences (1966).

National Trends Affecting International Development Education

Typical of growing university commitments to world affairs, Education and World Affairs (EWA) was formed in 1962 as a nonprofit educational organization to assist in strengthening international teaching, research, and service activities in U.S. higher education. EWA was an outgrowth of a study by Morrill and others (1960) who examined U.S. university activities and relationships in international affairs and recommended a mechanism for encouraging such activities. Nason and others (1964) subsequently looked into undergraduate liberal arts curricula with respect to the place of world affairs and non-Western studies. Gardner (1964) recommended positive reciprocal responsibilities between AID and universities in the conduct of overseas development activities, and EWA (1965) described in great detail the experience of six leading U.S. universities in approaching world affairs activities. Most recently, EWA's Committee on the Professional Schools and World Affairs established task forces in eight professional areas and issued individual task force reports which will be published in one volume soon (in press). These reports call for increased commitments of all funds to world affairs, including more attention to the development problems of other countries. Additional EWA occasional papers deal with problems of international development, as, for example, Masland's (1967) study on the role of U.S. assistance in educational development in Africa.

The American Council on Education, through its Commission on International Education, has consistently encouraged greater involvement of higher education in international affairs. It publishes regularly a *Bulletin on International Education* and has recently published a comprehensive study on universities and development assistance in other countries edited by Humphrey (1967). This report calls for more international development research; technical assistance administration and programing; research to facilitate development programing and planning in specific countries or regions; research on processes of technical change and development; and research leading to technological, scientific, and other innovations applicable to developing areas.

These and other efforts have been useful catalysts in helping achieve the passage of the International Act of 1966. Brademas (1966) issued a comprehensive collection of readings on international education as background papers for Congress in considering the Act. Unfortunately, funds have not as yet been appropriated to implement the provisions of the Act; but if it is ultimately funded, it will make available substantial sums for specialized research and training activities in international development education. Even without such earmarked funding, the Office of Education has been, in recent years, funding educational research activities of U.S. researchers who wish to undertake studies in countries where there are reserves of P.L. 480 blocked currencies.

A number of U.S. professional education associations maintain international committees, commissions, and councils. For instance, the National Education Association participates actively in the program of the World Confederation of Organizations of the Teaching Profession, also headquartered in Washington, D.C. The American Association of Colleges for Teacher Education has organized a variety of research and service activities overseas and has recently published a report edited by Taylor (1967) on a world conference convened to discuss teacher education problems. The National Association of Educational Broadcasters has advised a number of countries on problems of educational technology and is currently overseeing a long-term evaluation of the educational television system in American Samoa. The AERA International Research Committee encourages the Association's international involvement. The Department of Audiovisual Instruction of the NEA holds international postconvention meetings which have been well attended by members in recent years.

Additional References: Fraser (1965); Institute of Advanced Projects (1966); Wells (1964).

Activities of International Agencies

International development education has been by no means an exclusive enterprise of U.S. universities or institutions. Many United Nations Educational, Scientific, and Cultural Organization (UNESCO) programs have had a direct relevance for this effort, especially as educational development has become a prime purpose of the organization. UNESCO, in collaboration with other United Nations regional and world agencies, has been responsible for important programs of action and related research. Regional meetings of national ministers of education have been held regularly to identify development education needs and to establish priority goals for the future. Pilot projects in teacher education, science education, literacy, educational planning, and other fields have been assisted by UNESCO, many with built-in research components. Recently, strong attention has been given to the possible use of new educational methods and techniques to accelerate the impact of education in development. Many UNESCO efforts will be mentioned later in this REVIEW.

UNESCO-related institutions undertake research and dissemination activities in many areas. The International Institute for Educational Planning has published a directory of institutions engaged in educational planning, training, and research (1964b), an inventory of needed educational planning research (1965), a bibliography on educational planning (1964a), plus a variety of research reports mentioned throughout this issue. A recent significant study by Coombs (1967) attempted a systems analysis of the world educational crisis. This document was used as the major background paper for the World Conference on Education convened by President Johnson in Williamsburg, Virginia, in October 1967.

The UNESCO Institute of Education, Hamburg, regularly brings top educators together to study development education problems. The International Bureau of Education in Geneva regularly surveys the status of educational activity throughout the world, publishing jointly with UNESCO the results of these surveys, some of which are reviewed in Chapter VI.

Regional offices of UNESCO for Latin America, Africa, and Asia disseminate research information, and the recently inaugurated *Bulletin of the UNESCO Regional Office in Asia* (Bangkok) has already published noteworthy research studies. Specialized UNESCO regional research and training centers in educational planning, cinematography, documentation, adult education and literacy, child development, reading materials, and other areas publish a variety of significant documents.

The Organization for Economic Cooperation and Development (OECD) has contributed greatly to the field of manpower planning and curriculum study as related to development. The OECD (1967a) Development Centre published an extensive list of bibliographic aids on deposit at the headquarters in Paris, and the Centre answers inquiries for relevant documentation from responsible researchers in development education. OECD (1966) has also issued an excellent two-volume annotated bibliography on the educational factor for development. Especially significant are the OECD's manuals and studies on quantitative methods in educational planning, many of which will be noted later in this issue.

The International Labor Organization undertakes a variety of activities in technical and labor education and maintains an extensive and carefully classified documentation collection. The European Common Market, headquartered in Brussels, and the Council of Europe, headquartered in Strasbourg, undertake a variety of research activities having to do with education in development. The Council of Europe publishes a compendium of bibliographies on education by country (1966). Finally, the Pan American Union, Secretariat of the Organization of American States, headquartered in Washington, D.C., publishes a variety of studies on education in Latin America, including summaries of educational research (1966), and stimulates planning activities through regional meetings of all kinds.

Although the above listing is not comprehensive, it is sufficient to illustrate the massive international efforts under way that can both complement and supplement individual or institutional research activities in development education.

Universities and National Research Agencies Abroad

A number of research institutions abroad, some affiliated with universities, undertake continuous research on problems of education and development. For instance, the Centre for the Study of Education in Changing Societies in Amsterdam, directed by Jan F. de Jongh, provides research support for Dutch technical assistance and is currently engaged in studies related to the content and quality of education in developing countries. The Institut für Bildungsforschung in der Max-Planck-Gesellschaft in Berlin, directed by Hellmut Becker, undertakes interdisciplinary and comparative studies in education, including studies of educational reform in European countries. The University of London Institute of Education under the leadership of Lionel Elvin has long been concerned with educational research in emerging countries, and the Institut d'Étude du Développement Économique et Social de l'Université de Paris, directed by François Perroux, issues a variety of studies on education in development, with special emphasis on French-speaking Africa, many of them published in its trimestral revue, *Tiers Monde*, and others in occasional papers. L'Institut Pédagogique National, Paris, specializes in research on pedagogical problems in developing countries. The Research Institute of Comparative Education and Culture, Kyushu University, Fukuoka, Japan, directed by Shigo Masui, is undertaking, among other research, interdisciplinary studies of personality formation in Southeast and East Asia and publishes some of its work in an English bulletin.

Research institutions within countries to undertake research on domestic educational problems similarly abound. In later chapters of this issue, the work of some will be noted. Among those which are most productive are the New Zealand Council for Educational Research in Wellington (G. W. Parker, director); The Australian Council for Educational Research in Melbourne and the Commonwealth Office of Education in Sydney; The National Institute for Educational Research in Tokyo (Masunori Hiratsuka, director); the Center for the Science of Learning, Keio University, Tokyo (Minoru Murai, president); the Hong Kong Council for Educational Research (Norman K. Henderson, chairman); the Central Education Research Institute, Seoul, Korea (Hyun Ki Paik, director); the National Council of Educational Research and Training of the National Institute of Education, New Delhi (S. N. Mukerji, director); the Makerere Institute of Social Research, Makerere University College, Kampala, Uganda; the National Bureau of Educational and Social Research, Pretoria, South Africa; the Centro de Estudios Educativas, Mexico City (Jorge Ortiz, director); the Instituto de Investigaciones y Mejoramiento Educativo, San Carlos University, Guatemala (Pablo Locayo, director); the Instituto Nacional de Estudos Pedagógicos and the Centro Brasileiro de Pesquisas Educacionais, Rio de Janeiro, Brazil; the Norwegian Council for Research in Schools, Oslo, Norway (Dagfinn Skår, chief inspector); the Institute for Educational Research, Oslo, Norway (Johns Sandven, director); the Pädagogisches Zentrum, West Berlin. Many of the above centers publish regular journals or bulletins. Full details (including addresses) of these and other institutions which were helpful in preparation of this REVIEW can be obtained from the International and Development Education Program, University of Pittsburgh.

Additional References: Brembeck (1962); Cser (1965); Hanson and Gibson (1966); Langeveld (1965); Roth (1964); Sanders (1966).

The Critical Elements

Quantitative Data

Much research in international education is limited because of the lack of reliable basic descriptive data in each country and comparable data between countries. For the past several years, there has been an intensive effort in most emerging nations to establish mechanisms for the regular collection and reporting of such data. Information needed includes such obvious items as number of schools, teachers, students at each grade level and in each type of school; budget figures; student flow data; student achievement data; information on teaching materials and equipment in each school; teacher salaries; etc.

The data-collection problem is complicated in many countries by lack of communication among schools, lack of care in individual schools in reporting, lack of cumulative records in schools, and lack of reporting procedures that can be handled by the local school staff. The nature of the school population causes problems in that teachers often have several teaching jobs in several schools, students may drop out for a time and return, and many students may repeat a grade for several years.

International organizations are attempting to help countries establish data-collection categories and procedures that are comparable from one country to another. The Organization for Economic Cooperation and Development (1967b), for instance, published a handbook suggesting such categories, and methods for collecting and ways of using data.

Once accurate data are collected regularly, the problem becomes one of making sense out of them so that educational administrators and planners can get a clear picture of the total system and can make projections into the future. This manipulation of quantitative data can take the form of sophisticated input-output matrices, totally computerized, so that the effect of any changes in the system can be projected in short order. Much of the research on such quantitative methods is reviewed in Chapter V.

One must be cautious, of course, in accepting such quantitative research as the totality of educational planning. The educational planner must take into account many social, political, and economic variables that are not (as yet, at least) quantifiable. Furthermore, the existence of an educational plan does not resolve the problem of educational development. Much study and research is needed on who should participate and in what ways in educational planning in order to ensure implementation; on the feasibility of plan implementation, given political, cultural, and other restraints; on the decision-making points in educational systems of various nations and how these can be influenced; and on how innovation in educational methods, techniques, and strategies can affect the educational plan.

Reciprocal Effects of Education

It has long been accepted that education both affects society and is affected by it. It is critical in development education to know more about this reciprocal relationship if educational planning and development is to achieve desired goals. Chapters II, III, and IV explore research on these relationships. Studies range from aggregate attempts to correlate economic, political, and social change over time with educational data, to studies of the effect of specific kinds of education on people, cultures, and economies. More research is needed of the micro variety, dealing with such problems as reasons for school desertion, educational influences on entrepreneurial skills and attitudes, effect of parental attitude on vocational aspirations of students, ways of understanding and influencing parents' aspirations along with those of their children, effects of economic and cultural background of children on school performance, and ways of modifying the school experience so as to take into account the varied backgrounds of children which affect achievement.

Educational Content, Methods, and Techniques

Closely related to the above studies are those which research the effect of educational content, methods, and techniques on educational output. Chapter VI explores a sampling of these efforts. Studies of this nature range from microresearch on effectiveness of specific types of teaching materials on individual children to consideration of new strategies for reaching larger numbers of students via television, programed instruction, "systems" of instruction, correspondence study, and the like. Content, method, and educational strategy are intimately related, and research on each part and on the whole is increasingly needed.

Educational Exchange

Finally, an integral part of development education is a concern for the sharing of skills, abilities, and knowledges among nations. Chapter VII explores research on the effect of educational exchange programs on the people and nations participating. These are the programs designed to prepare leadership for development and to create an atmosphere of international understanding conducive to development. We are only now beginning to define the many problems in this area.

Conclusion

The recent heightened interest of educators and social scientists in international development education is both boon and bane. Research in the social sciences provides data relevant to the educator concerned with international development education. However, the tendency of scholars to work independently of each other produces research with disparate and often contradictory substance.

It is no longer, if it ever was, reasonable to assume that we can all go our own research ways and hope to have an effect on anything so complex as international development. It is not enough that dialogue exist between educators and social scientists, nor even that dialogue occur among the social sciences. Until multidisciplinary research teams conduct truly interdisciplinary research into the critical elements of international development education, we shall continue to conduct ourselves intuitively, basing our operational decisions on past near-misses.

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CHAPTER II

Education and Economic Development

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The belief, widespread and largely intuitive, that education somehow contributes to the improvement of a society has long been held. But in recent years, as the improvement of society has been more precisely defined, at least in the economic dimension, by governments and peoples explicitly seeking to raise their material standards of living, intuition and acceptance of that notion have not been sufficient. Clarification, understanding, and formulation of reliable generalizations that could serve as a guide to policy in countries seeking modernization and industrialization have become highly important, even vital. The purpose of this paper is to examine the scholarly community's response to this need, which is represented by the growing body of research that links education to economic growth and development.

Substantial interest in the subject is reflected in the rapidity with which the terms *human capital* and *human resources* have been adopted, and in some cases reduced to slogans, in many parts of the world. It is also demonstrated by the increased amount of research that has accumulated in recent years. But interest in this relation is not entirely a recent phenomenon. At least since Adam Smith wrote *The Wealth of Nations* in 1776, some economists have recognized the concept of human capital (Vaizey, 1962). Nevertheless, although a profession full of disciples often invokes Adam Smith much as a deity, it must be recognized that concern for human capital and the role of education in its formation became real only in the mid-1950's.

The body of research bearing on this field has been well summarized by Benson (1967), Bowen (1964), Eckaus (1962), Rivlin (1962), Schultz (1963, 1967), and Woodhall (1967) and reported in three bibliographies by Alexander-Frutschi (1963), Blaug (1966a, c; 1967), and Deitch and McLoone (1966). For this reason no effort has been made here to consider all the sources of investigation. Rather, we have attempted to put this substantial body of work into a historical and logical perspective, indicating the origins of the various approaches taken and the problems associated with them. The literature reflects three such approaches: human resource development, education as a factor in technological change, and human capital formation. Each will be considered in separate sections of this chapter.

The Development of Human Resources

One of the modern origins of interest in the relation between education and economic growth was the recognition of the obvious links among education, employment, and desired or planned economic growth.

Kuznets (1957) showed that the process of economic development implies some rather distinctive shifts in structure of employment. For example, he found that the proportion of the labor force engaged in agriculture declines while the proportion employed in manufacturing rises. Beyond this, it has been shown that as production processes become more complex technical specialization increases (Rostow, 1960). Thus, the connection is extended from the education-employment link to economic development and change. Just as the size and structure of an economy can shape the distribution and quality of the labor force, so was it gradually accepted that the labor force, operating largely as a limiting factor, could significantly affect the level and composition of national output. This observation underlay the research centered in the problem of human resource development.

If the relations between education and employment and between employment and economic development were not entirely clear in theory, they began at least to emerge for the practitioners of economic development. The planning of economic development became widely accepted after World War II as backward countries attempted to allocate or reallocate rationally their very scarce resources in such a manner as to bring about higher rates of growth. Borrowing heavily from traditional approaches of Western economics, attention was focused on labor and capital, customarily defined as the sole factors of production. A perusal of early development plans reveals virtually no concern about the *quality* of human resources. It appears that only with gradual recognition that physical capital, within a reasonable range, is not a sufficient condition for economic development to occur did planners become keenly aware of the manpower bottlenecks that had been created. In extreme cases this was manifested by hospitals with modern equipment that never opened for a lack of nurses. In less dramatic form it was reflected in very low levels of output from plants in underdeveloped countries that were entirely comparable to those in developed countries. These phenomena created another source of concern about the education of a nation's manpower and its economic well-being.

Associations Between Education and Economic Growth

In search of human resource development policies that could accelerate the rate of economic growth, researchers also looked at the experience of many countries both cross-sectionally and over time. In a cross-sectional analysis, Svennilson, Edding, and Elvin (1962) correlated enrollment ratios and gross national product (GNP) per capita for 22 European countries and found a positive relation, although dispersion, particularly in the middle range of observations, was rather wide. Harbison and Myers (1964) prepared a composite index of human resource development—arithmetic sum of enrollment at the second level of education as percentage of the age group 15-19 adjusted for length of schooling and enrollment in the third level of education as a percentage of the age group multiplied by an arbitrary weight of five—through which they classified 75 countries into four levels. This index and 11 other indicators were correlated with two indicators of economic development, GNP per capita and active population in the agricultural sector. High correlations were found between the composite index and development indicators; lower correlations were found when the other variables were used.

Bowman and Anderson (1963), in a multiple-factor analysis of 32 countries, found a low positive correlation between postprimary education and income per capita. The relation was improved somewhat when countries most advanced in literacy were excluded. Moreover, they reported that primary enrollment and the level of literacy in the population were better predictors of economic growth than was postprimary enrollment and that the addition of postprimary education in a multiple-factor analysis improved the fit.

Aside from the serious measurement and data problems that limited the use of international comparisons of economic and educational variables, associations of this type had relatively little explanatory value. It was generally recognized that association does not identify causation and that causation logically may work both ways: higher levels of education embodied in the population may be expected to increase rates of economic development, and, at the same time, increasing levels of income may make available a greater supply of educational services to the population. New designs were needed to test causal hypotheses, particularly in disaggregated analysis of the processes through which education and development are related. There was no convincing evidence that education is a necessary condition for economic development.

Since the effect of education on economic production is presumed to operate after persons leave school for the period during which they are in the labor force, lagged correlations between prior enrollment and later income should show the economic effect of increased enrollment in schools. In their study (1963) Bowman and Anderson investigated this point and found some association as expected. The influence on economic growth of factors other than increased enrollment was so great, however, that none of the indicators of educational development used was correlated as highly with later income as was the earlier level of income.

McClelland (1966) undertook to test the hypothesis that the level of education caused later economic development. His use of standard scores of rates of economic growth (defined in terms of consumption of electricity rather than the more conventional measures of national income) showed that countries with relatively higher levels of education embodied in the population developed at a significantly faster rate. However, he found that this relation did not hold when enrollment rather than the stock measure was used. Schatz (1965) has seriously criticized the use of this measure of economic growth by McClelland. It seems clear, however, that research designs of this type are required to produce needed information.

Along similar lines, Peaslee (1967) undertook a historical study of the 34 countries now most advanced in production per capita. He discovered that in every case significant economic growth followed attainment of a primary school enrollment level of 10 percent of the total population. He suggested the possibility that some minimum threshold level in primary enrollment may be necessary for growth to ensue and thus offered a possible explanation for the observed weak correlation of postprimary enrollment and growth as well as the often noted sluggish growth in India, Pakistan, and Egypt where postsecondary enrollments have been relatively high.

The Concept of Human Resource Development

A sense of urgency was apparent in much of the development literature; a heavy emphasis was placed on achieving rapid rates of economic growth. Much of the research in human resource development was aimed toward policy formulation directly and, in fact, often conducted through or sponsored by governmental agencies explicitly for purposes of policy formulation in developing countries.

In this context the identification of policy instruments and conscious planning efforts at the national level were characteristic of the situation. For guidance, policy makers looked to the experience of the already developed countries, to existing theories of economic development, and to logical analysis. It was apparent both from the accumulating evidence about sources of economic growth in the developed countries cited above and from their own experience that infusion of physical capital alone could not satisfy growth requirements. Human skills, knowledge, and attitudes were required to complement physical capital inputs in order to achieve desired rates of development. The term applied to the process of achieving requisite human capabilities was *human resource development.* The concept itself, however, has not reached an agreed definition.

Correa (1963) chose to attach a narrow meaning to the concept of human resources, seeing it as the analysis of human beings as factors of production. Harbison and Myers (1964), however, preferred to restrict this economic function to the concept of human capital and to use the term *human resources* to refer to the development of man in all of his roles in a modernizing society. Parnes (1965) argued that the broader concept was so diffused that it led to confusion in thought and practice and that, further, it could lead policy makers to ignore the noneconomic purposes of education. He therefore urged limiting the concept to its traditional connotation, a means to an end, i.e., to manpower or productive inputs, in order to avoid confusing human resource development with a vaguer and broader concept. The Parnes concept has been customarily used in empirical work.

Education and Human Resource Development

Efforts to develop educational policy along human resource development lines typically assumed that the primary link between education and economic growth lay in the intervening manpower preparation, the process of preparing persons for the more complicated or sophisticated economic roles they would play in a more industrialized society. Tinbergen and Bos (1964) attempted to elaborate an educational planning model based on the assumption of a stable relation between economic production and the number in the labor force with secondary and higher education. Balogh (1964) strongly criticized this approach on the grounds that the assumed relations are not fixed, cross-sectionally or over time, and that treating education as a homogeneous commodity is unrealistic.

Similar charges have been made about the assumptions underlying other efforts to devise educational policy from the point of view of human resource development (Anderson and Bowman 1964). So far, all such efforts have been based on the assumption that there is an identified, measurable relation between (a) economic production and manpower requirements and between (b) specific manpower requirements (defined in terms of classes of occupations) and specified forms of educational preparation. These relations were known to be variable, and efforts have been made to devise better techniques for defining the relations for policy-making purposes (Hollister, 1966).

It is clearly wrong to assume that any and all education of a given length or level would have the same effect on economic development. Yet, analysis proceeded in this aggregative manner for lack of complete data and the scarcity of techniques to use the data available. Eckaus (1962) suggested the disaggregation of jobs into their educational requirements and a description of each occupational category in terms of the average level of educational attainment required for successful performance in a given occupation. Eckaus used U.S. 1940 and 1950 data to calculate educational requirements of the American labor force measured in years of schooling and months or years of specific vocational education required. Although the research reported was historical and approximative, this approach might be developed into a method for estimating current educational requirements for a developing economy.

Other attempts have been made to assess the economic significance of particular kinds of education. Anderson (1965) accumulated scattered historical materials which indicated that an adult literacy rate of about

40 percent was a threshold of economic development. He did not study the economic consequences of specific literacy programs in presently developing countries. Blaug (1966b), however, developed a logical framework for fruitful research in literacy education which might serve as a model for disaggregated analysis of other educational processes in relation to economic development. Gisser (1965) examined the effects of education on earnings in the agricultural sector, but such disaggregative studies have not been common.

There was a rising awareness of the insufficiency of schooling alone to influence significantly the rate of economic growth. Thus the concept of human resource development also focused attention on the corollary institutional changes necessary. Wharton (1965) found empirical evidence that education does play a role in raising agricultural productivity. It seemed to contribute through its effect on the "economizing behavior" and "economizing setting" of farmers, particularly in a context in which additional resources as well as better technology are provided simultaneously through a program of supervised credit. Similarly, Foster (1965) criticized the "vocational school fallacy" by arguing that until changes occur in social organization that make the utilization of new techniques profitable and meaningful, vocational instruction in agriculture would not induce young men to take up farming. He showed evidence that African students had a very realistic understanding of the occupational choices available to them given existing institutional arrangements.

Research in human resource development has suffered from the imprecise definition of concepts and inconsistent measurement methods. Much of the work has consisted of international comparisons, while genuinely comparable data and even a real understanding of the differences in educational structures were lacking. Considerable confusion has arisen from a lack of a distinction between educational stocks and educational flow measures. Especially needed, however, have been new and imaginative research designs capable of testing causality and degree of influence of education on economic development in specific circumstances. In short, there remained a severe need for research into the processes through which education of specific types contributes to development.

The Residual in Economic Growth

A search for the causes of economic development and for the factors that facilitate or retard it caused economists to open many new doors or to reopen others during the 1950's and early 1960's. In addition to exploration into human resource development another line of inquiry grew from efforts to examine the sources of past rates of economic growth for the currently developed countries. Growing amounts of historical data permitted diverse approaches to such studies.

One large group of studies focused on aggregate production functions; that is, they explored the relation between aggregate output and changes in aggregate inputs of labor and capital (Abramovitz, 1956; Kendrick, 1961; Solow, 1957). The findings varied in detail but agreed that measured increases in factor inputs were not sufficient to explain measured increases in national output. This raised a variety of questions of importance, not only for those concerned with spurring economic growth in the United States, but also for those concerned with the development of economically backward nations: To what extent were these results a reflection of an inadequate concept and measure of labor or capital? To what factors are advances in labor productivity attributable?

The search for answers to these questions caused economists to venture beyond the traditional confines of their discipline. One such foray took them deep into territory normally reserved by educationists. The leading effort to examine sources of economic growth in this manner and to use education as one of the omitted sources of growth was undertaken by Denison (1962a, b). He began with a set of time-series data on measured inputs and output for the U.S. economy from 1929 to 1957, using 1949 findings to calculate income differentials associated with educational attainment levels. Next he assumed that 60 percent of the difference was associated with educational differences while the remaining 40 percent was associated with such factors as energy, motivation, and so on. He found that from 1929 to 1957 the average quality of labor improved by 29.6 percent or at an average annual rate of 0.93 percent. This gain he believed to be due to superior education. Sixty-eight hundredths of 1 percent annually or 23 percent of the U.S. growth rate of the GNP from 1929 to 1957 was a result of the improved quality of the labor force—thought to be due directly to formal education.

Others have made similar attempts to derive quantitative estimates of the importance of education on more disaggregated growth rates. Griliches (1963, 1964), for example, estimated that roughly one third of the observed growth in labor productivity in agriculture came from the improved quality inputs "among which the rise in education per worker plays an important part." Although Griliches' technique was applied to the agricultural sector only, he recognized its general applicability to other sectors.

This so-called residual method of analysis perhaps raised more questions than it settled. It was also subject to a number of fundamental criticisms, primarily with regard to the underlying assumptions. Denison recognized that his conclusions rested largely on three key assumptions, including the assumed 60 percent of income differentials attributed to schooling, cited above. Moreover, the basic notion that the marginal productivity theory, and the assumptions needed to utilize it, could be applied to macroeconomic variables was fundamental to the analysis. Finally, it was necessary to use some early data and consequently to manipulate much of these data. This led Griliches and Jorgenson (1966) to assert that Denison had substantially overstated the amount of the residual.

Economists are groping with the theory of technological change; it is no longer sufficient to recognize that "technical change" is the source of more rapid rates of growth of output than inputs. But this complex concept obviously includes possible sources of such change in addition to education. The measurement and conceptual problems for nonhuman as well as human sources require further investigation (Solow, 1963).

Even in the field studied by Denison, a variety of questions remain to be answered. Denison restricted his concept of education to formal schooling, although other forms of education are surely significant. Furthermore, he treated qualitative changes in labor as a function of more schooling; yet the quality of the schooling itself was treated as a constant over the long run. A number of other technical considerations have been raised, such as the implied stability of the parameters of the production function (Griliches, 1963). Actually, we find that the theory is not yet sufficiently developed to produce a reliable evaluation of our quantitative findings.

Yet in the last analysis the problem is one of translating the ultimate "explanations" of economic growth from this type of approach to a policy for growth. Obviously it is more desirable to understand and quantify the sources of economic growth than to move toward a growth policy based on circumstantial findings or casual empiricism. The existence of a link between education and economic growth does not seem to have ever been denied by anyone. There appears to be no discernible movement, however, to utilize this residual approach in a fashion that would permit formulation of rational economic and educational policies. Even if we found an entirely unambiguous and universally agreed-upon estimate of the contribution of formal education to past rates of U.S. economic growth, it is not readily apparent how this would assist decision making about future investment in education.

The Concept of Human Capital

As noted at the outset, the roots of the human capital concept can be traced at least as far as Adam Smith. The education-employment, employment-productivity links, together with the existence of the residual, contributed to the strong interest that developed in human capital. A large proportion of the research in this field has been based on the notion that well educated persons are, from the point of view of society, a capital resource.

An individual invests in himself as he makes an expenditure that will increase his productive powers now or at some future date. If that expenditure contributes to improving his health, his wisdom and experience, his mobility or knowledge of other job opportunities, or his potential productivity, then the stock of capital may be said to have grown. Although investment has traditionally been defined as a current allocation of resources for purposes of expanding output at some future date and thus could encompass, for example, an educational program, investment in most countries is presently measured only in terms of expenditures on plant and equipment, construction, and inventories. A survey of elementary or intermediate economic theory texts reflects this confusion, for some writers define investment as an expenditure to implement the stock of capital as currently measured, while others conceive of capital as including human resources despite the fact that they may not yet be measured in customary estimates of the capital stock.

A policy approach to questions regarding the relations between education and economic growth has been labeled as the rate of return on the investment. Obviously, a very strict adherence of policy makers to the findings of alternative rates of return for alternative projects *ex ante* makes the choice among various investment possibilities an unambigous one. Goode (1959) has described the advantages of this as a guide for planning investment in human capital in underdeveloped countries.

The description of the rate of return given above is deceptively simple, however. There are a variety of ways to calculate the rate of return, and they can easily lead to different sets of priorities. In one broad category are efforts to calculate the value of the current stock of human capital based on the various costs associated with the production of this capital.

Another technique is to find the rate of discount that equalizes the (additional) costs of amounts of schooling in the present period with additions to the lifetime stream of income that occurs as a consequence of this education. Simply, an estimate can be derived by taking the (absolute) average income difference of persons with differing levels of educational attainment, treating the costs of schooling as negative income and then solving for the rate of interest (return) which sets the discounted value of lifetime income differences equal to zero.

A measure of absolute average income differences in the current period is commonly employed for the obvious ease of using comparable data. Miller (1965), however, demonstrated that this technique tends to produce underestimates of lifetime income for a variety of reasons, including the implicit assumptions that there will be no future income growth and that there is no future increase in life expectancy.

The investment in education was generally taken to be the total cost of education. A basic problem, therefore, lies in separating the consumption and investment components of such expenditures. Perhaps the largest single part of the literature that has developed in this broad field dealt with the concept and measurement of the costs of education. Temporarily brushing aside the question of private versus social costs, the treatment of the income forgone by students while receiving an education, particularly at higher levels of study, became an important question. Vaizey

(1958) appeared at one end of a conceptual spectrum by entirely neglecting opportunity cost, the income that students forgo while attending school. The quantitative use of opportunity cost as a calculable cost of education, on the other hand, was demonstrated by many; Schultz (1963), for example, showed that about 60 percent of the cost of educating high school students in the United States in 1956 represented earnings forgone, and that the proportionate cost for secondary students in Israel, Mexico, and Venezuela was as high, and in some cases higher.

Although Vaizey found himself largely alone at this pole, a wide variety of costs exist, some of which were used in some studies and not in others. For example, there was uncertainty about including indirect subsidies made to schools because of their tax-exempt status. Even more unclear is how to assess the psychic income of teachers, which presumably explains some of the supposed low pay of teachers. Bowman (1966) has written an interesting summary of the problems of costing.

When we ask about returns on investment to society, rather than to the individual or his family alone, the issue becomes even more difficult; a number of conceptual problems arise, the resolution of which can significantly affect educational decision making. For example, to what degree does education for females get translated into higher potential earning power for offspring? The seemingly wasteful expenditures on certain types of education for those women who never enter the labor force may appear more rational in this light. Do well educated women make better consumers and hence contribute to higher real income for their families than the poorly educated?

The crucial distinction between the private and the social return on investment becomes obvious in countries that have been plagued by a net outflow of human capital, i.e., a brain drain. The same problem exists within a country where educational decision making takes place at local levels. Weisbrod (1964) was cognizant of this problem when he attempted to calculate the economic benefits to society of education in the most comprehensive study to date of this problem.

Despite some of the conceptual difficulties associated with this approach certain advantages are quite clear. Since the technique can be applied to cross-sectional data, a wide variety of cases may be studied. Further, the ability to use cross-sectional data probably permits the user greater confidence in the quality of data that are more current. This is in contrast to the residual approach which must rely upon time-series data, which typically implies fewer available variables and less reliable data. Moreover, alternative rates of return can be calculated both from alternative investment opportunities within the educational sector and between possibilities in education and other sectors. Thus, the usefulness of the technique for policy purposes is obvious. Studies using this technique have already appeared for underdeveloped countries as well as for various subsectors (regional or other) in the United States. Much of this research has emanated from the University of Chicago under the guidance of Theodore Schultz.

Carnoy (1967) calculated private and social internal rates of return in Mexico. With some minor adjustments he was able to compare his findings with those of others for Chile, Colombia, and Venezuela. He concluded that the profitability of educational investment and rate of growth of the economy are intimately intertwined. His findings led him to infer, tenuously, that during periods of most rapid economic growth it is the primary and university levels of schooling that require "the greatest amount of attention" since the very high rates of return there are indicative of a market unresponsive to changing labor demands. A wide range of studies, in more or less the same fashion, yielded similar findings and were summarized by Schultz (1963, 1967).

A frequent criticism of the rate of return approach is that it neglects the noneconomic benefits of education. For the main part, however, to use the rate of return as the sole criterion for educational planning appears to be anathema to economists and to educationists alike, despite the many straw men that have been erected which suggest otherwise.

Another frequent criticism of rate of return studies was the neglect of many to do more than pay lip service to the obviously high positive correlation between educational attainment and "innate qualities." Cross-sectional income differentials associated with education cannot be used alone to make calculations on returns from education because such factors as intelligence, family income, and so on are hidden. The criticism is raised in its more intelligent form by Houthakker (1959). Becker (1964), however, demonstrated that such factors as IQ, class status, and father's occupation could be introduced into such analysis as explanatory variables, thereby permitting a better estimate of the relation of education to income. Regrettably, many others have not attempted to duplicate Becker's approach. Further, such factors as need for achievement or cultural parameters have not been introduced in a similar way despite wide interest in the findings of McClelland (1961).

Many studies were limited to formal education in spite of the mounting evidence of the importance of apprenticeship, on-the-job training, and other informal methods of acquiring skills. Recognition was occasionally given to this inadequacy when estimating the stock and sources of human capital, but little was offered by way of consolation. Wiles (1956) was one of the few who attempted to avoid this in his study of Great Britain. Until nonschool education is incorporated quantitatively into models of this type, one large set of policy alternatives is effectively closed to consideration for the planner.

Balogh and Streeton (1963) raised several other legitimate questions about the rate of return approach. If, just for the sake of argument, one accepts the concept of education as an important condition for economic growth, they ask, is it a sufficient condition or a necessary condition?

Vaizey (1962) argued that "education is not the golden key to growth; if it were, India and Egypt would be much richer than they are, especially since Egypt has many more graduates per head of population than England." But Vaizey's fallacy, and an error that follows from any hyper-aggregative approach to education, is that the returns from all forms of education can be inferred to be the same as the average return. The perennial unemployment and underemployment of university-trained lawyers in Latin America does not imply that low rates of return will occur for investment in veterinarians. (Interestingly, Adam Smith described and explained this phenomenon for British attorneys in the eighteenth century.) The question raised by Balogh and Streeton takes on additional concern when they ask whether the experience of education in the now developed countries has much carry-over in the different environment of the underdeveloped world today. Also it raises some questions about possible negative social returns from education. For example, Schumpeter (1947) described the instability and discontent generated by an educated class of unemployed.

Balogh and Streeton and others have implied, though very few have said so explicitly, that calculations based on average income differentials or average rates of return are potentially misleading since it is the marginal rates that presumably should guide policy. Bowman (1962) pointed out that this criticism can often be applied to economic problems when the measurement cannot be developed as far as our theory would warrant. This presumably is a caveat that must be borne in mind when making conclusions for policy purposes, but surely not a major obstacle to the use of this technique. Limited inferences can be made on this point on the basis of findings by Becker (1964) and Miller (1960). Miller found that the relatively large increase in the number of workers with college training did not appear to be inimical to their relative income position, i.e., the ratio of average lifetime income of college graduates to high school graduates was fairly stable. Becker found that the rate of return to college graduates did not diminish over the same period of time, although it was not as stable for high school graduates. The secular stability of the return to college graduates suggests that the consideration of marginal versus average rates of return is of limited concern, at least for the United States. However, stability of long-term average rates of return, implying a harmony of marginal and average rates, may be part of a developed economy syndrome, an indication of limitations in our estimating techniques, or explicable in other ways not relevant for any other nation.

Aside from many questions of what appropriately should be counted in estimating costs and returns to education, very little delineation has been made between expenditures representing investment and those representing consumption. Shaffer (1961) asserted that the portion of education directly or indirectly contributing to higher levels of total product is conceptually inestimable, and to attempt to estimate it, much less to apportion those educational costs between investment and consumption, seems to be an obstacle that no economist can hurdle, given the state of the art in education today. To treat all costs as investment is the next best alternative compatible with the current state of our theory. Obviously, more work needs to be done in the attempt to separate the consumption and the investment aspects of education. Moreover, the qualitative aspects of the same types of education must be reckoned with.

A final comment is raised more as a question than as a criticism of the approach described above. Over and over again economists writing in this field make the normative assertion that education decision making ought not to be based solely on economic criteria. Where *ceteris paribus* conditions apply among various educational (investment) alternatives, use of the rate of return approach would appear to be the most rational. But in the presence of acceptable alternatives, how much stress should be placed on the rate of return as a criterion for establishing priorities?

Let us restate this question in a less abstract fashion. When projected rates of return on expenditures in education are higher than those projected for physical capital, policy makers presumably will choose to invest in one of the alternative forms of education. Since very high rates of return have been estimated in the United States, United Kingdom, and elsewhere, this description of the world is hardly remote. But Gounden (1967) reported that since the rate of return of physical capital is higher than that of education, relatively more emphasis on physical capital investment may accelerate the growth of the economy. Should resources currently flowing into education be reallocated to investment in physical capital on the basis of this finding? How important, quantitatively, do the noneconomic considerations become in shaping this decision? Despite Carnoy's (1967) findings, there are several a priori reasons for anticipating that future calculations of social returns from education in backward countries may show relatively low rates while returns to physical capital will be relatively high, as Gounden found. One such reason, for example, is the wide gap between social and private rates of return where a net outflow of skilled workers is occurring. In the last analysis, our issue is not with the rightness or wrongness of the technique, but with its usefulness in most situations. As soon as we admit criteria that fall outside the economic calculus, as must be the case in education, we seriously limit their applicability to problems of resource allocation. Although it would appear extreme to claim that in such cases rates of return are of no importance, it is likewise clear that their usefulness is limited.

Accepting, then, a limited usefulness for this approach, we assert that the relevance of this technique is probably inversely proportional to the degree of aggregation involved. When governments or citizens learn that returns from education, per se, are high, they know little. They begin to know more as levels of educational attainment are specified, as rural and urban schools are delineated, as formal vocational, professional and preprofessional, and general educational programs are separated, and so on. Moreover, looked at another way, investment in buildings, administration, learning materials, teacher salaries, and maintenance may not yield equal marginal returns. Much research has been of the more aggregative, less practical variety. As the revived concept of human capital leaves infancy, we may hope that analysis on more disaggregated levels will be pursued. And, as projections become less of a novelty, interest in them will center almost exclusively on their use for policy formulation.

Some criticism has arisen from those who correctly foresee the difficulties of neglecting the qualitative aspects of education because of the basically quantitative approaches to the problem. It appears that the necessary first step in avoiding these difficulties is to attempt to identify measures of qualitative differences. Two recent studies leave some room for optimism in this area (Firman, 1966; Correa, 1964). Correa's study suggests a useful method, although it suffers from an inadequate-sized sample and from possible bias in selection of observations. It should be reworked with other data to determine how useful his findings are.

The evaluation of educational quality is an area in which economists should rightly fear to tread but where they inevitably must if educationists do not proceed. The conventional wisdom that associates qualitative improvements with increased expenditures must be tested in a variety of development situations, but only after an agreement can be found on what constitutes improvement. Acceptable criteria for the developed countries may not be totally applicable for the underdeveloped world. Until a relevant theoretical structure, supported by empirical search, is developed for the poorer nations of the world, the quality bottleneck will retard the work of scholars and of economic and educational planners.

Further Directions for Research

All of the approaches to understanding the relationship of education to economic development described here are deficient. The relations clearly are neither simple nor unidirectional; the results so far obtained open the question and serve as a basis from which more fruitful research may be anticipated. They demonstrate principally that greater depth of analysis is required in addition to greater attention to specific types of education, to specific consequences of education on behavior, and to the effect of this behavior on the development process.

Two seminal explorations into the causes of development have been published by scholars attempting a cross-disciplinary approach to this multidisciplinary problem. Hagen (1962) undertook a re-evaluation of the factors which cause a traditional society to become one in which economic growth is occurring. He emphasized the significance of "technological creativity" in a society. Hypothesizing about some of the personality characteristics, he suggested probable processes that would induce technological change and consequent economic development. McClelland (1961) approached the same issue from the point of view of development of entrepreneurial behavior in the society, the probable personality characteristics of entrepreneurs, and their psychological need for achievement. In both of these cases an emphasis was placed on individual behavior patterns and their origins. Although the theories advanced require further elaboration and refinement, their emphasis on the individual is especially significant for education, for if specific characteristics can be isolated that create a population relatively more adept or intent on development, it might become possible to design programs (e.g., adult education in child-rearing practices) that would affect the rates of economic development.

Proof of the amount and magnitude of the effect of a particular education on behavior and, in turn, its effects on economic growth are essential, however. Without such proof the considerable controversy over the utility of the rate of return mode of analysis and of the accuracy or validity of manpower forecasting techniques is essentially sterile. Educational policy decisions must be made now and must continue to be made in a way that will not constrain future decisions. Important decisions, important not simply because they involve large sums of money but also because they may affect the stability of our world in the long run, are being made now. In order to make sound decisions, educational researchers must work with scholars from the social sciences to discover the processes, the ways and the means, through which economic development occurs.

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CHAPTER III

Education and Political Development

HANS N. WEILER

Eleven years ago, Easton (1957, p. 305) observed that "research regarding educational institutions has receded to a distinctly peripheral position in the discipline [of political science] as a whole." Although it is arguable whether political scientists, with a few notable exceptions, had ever regarded education as more than peripheral with regard to their discipline, Easton's statement was certainly correct at the time it was made. Today, educational systems and processes have assumed a significant place in political science research. American political science has become aware, so to speak, of the educational dimension of politics. At the same time, little evidence can be found to indicate that the educational profession, in a corresponding manner, has become as aware of the political dimensions of education. To be sure, a number of exceptions have to be acknowledged —most notably the work by Hess (Hess and Easton, 1960; Hess and Torney, 1967) on political attitudes of elementary school children—but by and large what modest insight we have at the present into the relationship between education and politics is overwhelmingly the result of theory building and research by political scientists, particularly in regard to the more specific developmental and comparative perspective implied by the notion of political development as one of the proposed correlates of education.

On the whole, comparative education as a field of specialized research in professional education has failed to transcend its principal concern with what Coleman (1965), in using one of C. A. Anderson's terms, has called "intra-educational analysis." At the present time, it remains to be seen whether new programs in international development education, promising as they appear to be in this respect, will indeed bridge the difference that separates professional educators from social scientists in their respective concerns with the economic, sociocultural, and political implications of education.

While it is fairly accurate to say that the attention paid to education by political scientists is a relatively recent phenomenon, it is worth noting that this concern has some important precedents, the most significant of which is undoubtedly the work of Merriam (1931, 1934). Merriam's work on civic education in the United States and seven other countries can be regarded, conceptually and methodologically, as rather "impressionistic" and lacking in "direct observation of developmental processes" (Greenstein, 1965, p. 6). It still stands out, however, not only as an attempt to identify salient aspects of the relationship between education and politics, but also as one of the first applications of comparative approaches to a functional analysis of educational systems. The continuing relevance of Merriam's studies is explicitly acknowledged in a recent analysis of education and politics in Nigeria (Ogunsheye, 1965).

Sporadically, more rigorous empirical research on political socialization, one important aspect of the relationship between education and politics, began to appear in this country in the fifties. These developments were reviewed and analyzed by Hyman (1959) just before the first results of two significant further studies on the political socialization of children in the United States (Greenstein, 1960; Hess and Easton, 1960) were reported. Since then, several studies concerned with the role of education in political socialization as well as with other aspects of the education-politics relationship in the United States have appeared. A listing and review of many of them in terms of their implications for the teaching of social studies have recently been provided by Patrick (1967) and Sigel (1965).

For the purpose of this review, however, our main interest is directed toward the developmental context of the relationship between education and the polity. Therefore, since development processes are most adequately studied in comparative terms, we must go beyond the research done in one particular country and concern ourselves with research in as large a variety of political systems as possible. This approach not only involves an expansion of the geographical frame of reference, but also draws our attention more closely to those theoretical propositions which lend themselves more directly to verification by comparative and cross-national inquiry.

The Concept of Political Development

Some of the conceptual and theoretical developments in political science which have contributed to present interest in the role of education in political development are discussed by Almond (1966), Almond and Powell (1966), Easton (1965a), and Eulau (1963). Current scholarly concern with education and political development is an integral part of a wider frame of reference for political analysis. The development of this framework—a new paradigm of political science, as Almond (1966) calls it—is characterized by the emergence of several different, yet closely interrelated, conceptual constructs. Among these, the notions of the political system, of political behavior, and of the political culture contribute to a useful conceptualization of political development. A number of the above authors point out methodological stipulations about the way in which this conceptual framework can be made operative for political analysis in general, and for the study of the relationship between education and political development in particular. Much of this theoretical development was brought about by various kinds of intellectual interaction across discipline boundaries and by the reception and adaptation, on the part of political scientists, of empirical evidence and theoretical propositions developed in the fields of psychology, anthropology, sociology, and—in a somewhat more indirect way—the natural sciences.

Easton (1953; 1965a, b) attempted to develop a logically integrated set of categories, with strong empirical relevance, that would make possible the analysis of political life as a system of behavior. The political system operates within an environment with which it interacts in various identifiable ways. The environment in turn consists of other systems (ecological, economic, demographic, international, etc.) which affect, or are affected by, the processes and properties of the political system. The political system is distinguished by the nature of the input it attracts, by the way in which it processes or converts this input, and by the effect it has in bringing the results of the conversion process to bear upon other systems. To perceive the educational system as a part of the environment with which the political system interacts provides the possibility of further conceptualizing the relationship between educational processes and political behavior. Easton (1957) hinted at some of these dimensions of system interaction between education and politics and later presented important empirical results from further probing into this interaction in his studies of political attitudes and beliefs of American children (Easton and Dennis, 1965, 1967; Hess and Easton, 1960).

Largely under the auspices of the Committee on Comparative Politics of the Social Science Research Council, both a developmental and a cross-national perspective have been introduced into the analysis of political life, and a tremendous stimulus has been provided to the comparative study of factors determining political behavior and its changes. While operating within the basic tenets of a systems approach to political analysis, the members of that committee and their associates and students have contributed substantially to the effort of conceptualizing the development of political systems and are providing an increasing number of empirical studies. Under the sponsorship of the Committee, or in close cooperation with it, two important series of publications have been launched: the Studies in Political Development (e.g., Coleman, 1965; LaPalombara, 1963; Pye, 1963; Pye and Verba, 1965) and a Series in Comparative Politics under the general editorship of Almond, Coleman, and Pye (e.g., Almond and Powell, 1966; Almond and Verba, 1965; Fagen, 1966; Pye, 1966).

A useful construct is that of the political culture, originally developed by Almond (1956, 1960), which has since served as the conceptual focus for an increasing number of comparative analyses of political systems (e.g., Almond and Verba, 1965; Pye, 1962; Pye and Verba, 1965). In Verba's (1965, p. 513) definition, "the political culture of a society consists of the system of empirical beliefs, expressive symbols, and values which defines the situation in which political action takes place," and it thus "provides the subjective orientation to politics." The notion of political culture is useful in relating educational factors to the operation and change of political systems. The first major comparative study (Almond and Verba, 1965) using the framework of the political culture paid a great deal of attention to the role of education in the formation of political attitudes and, thereby, of the political culture. A collection by Pye and Verba (1965) of several country studies within a common political culture and political development framework contained likewise numerous indications of the importance of educational variables in the analysis of the cultural dimension of political systems. In this regard, the chapters on Britain, Egypt, and Japan presented particularly useful evidence.

A further, if somewhat indirect, link between education and the political system is provided by the notion that political cultures are learned (Verba, 1965). A joint exploration of this proposition by learning theorists and political scientists could yield exceedingly valuable hypotheses for further empirical research. An interesting attempt in this direction is Merelman's (1966) discussion of the relationship that exists between learning and legitimacy.

A new way of thinking about political development has resulted from the conceptual basis provided by the interpretation of political life in systemic, behavioral, and cultural terms. While a great deal remains to be done before the operational utility of the concept is firmly outlined in behavioral terms, several valuable propositions can already be explored by the student of education and political development. Almond and Powell (1966) specified three variables—role differentiation, subsystem autonomy, and secularization—for the identification of "levels" of political development. This conceptualization allows the perception of not only structural but also cultural determinants of change in political systems. Within this frame of reference, useful analytical tools can be defined for studies of the effect of educational processes on such developmental phenomena as role differentiation and secularization.

In the same theoretical context, political socialization is understood to be "the process by which political cultures are maintained and changed" (Almond and Powell, 1966, p. 64). If education can be regarded as one of the important "agents" of political socialization, then the study of political cultures in a developmental perspective is indeed bound to look to the educational system as an important factor of change.

Although the Studies in Political Development and the Series in Comparative Politics represent the most extensive effort at exploring, both theoretically and empirically, the notion and realities of political development, a number of other studies in recent years have provided further insights into the same general problem. Some of these offer additional possibilities for conceiving the relationship between education and political development. Eisenstadt's (1966) work on modernization and the development of political systems introduced some sociological considerations into the analysis of political development and stressed the organization and structural dimensions of development processes. In this framework, the political implications of education were discussed in terms of the demands for the products and the rewards of education as well as the diversification and differentiation of the supply of educational services (Eisenstadt, 1964, 1966).

An attempt to consider the notion of political development in the policy context of foreign aid was presented by Packenham, who argued for a "more explicit and sophisticated political-development policy in the U.S. aid program and in U.S. foreign policy generally" (1966, p. 235). Rustow (1967) focused his exploration into the problems of political modernization on the prerequisites of the nation-state and on the types and functions of leadership in new states. His study can serve as a suitable framework for analyzing the role of education in inculcating a sense of national identity and in contributing to the recruitment of political leadership. Kautsky (1962), in an attempt to assess the impact of industrialization on the politics of the developing countries, re-examined the meaning of nationalism and communism for these countries and arrived at a useful typology of political systems along a modernization continuum.

Among other contributions to the study of political development, Apter's (1965) work on the politics of modernization provided many as yet unexplored possibilities for identifying the social and political correlates of educational development and, incidentally, served as a particularly impressive demonstration of the labor involved in any such attempt. Banks and Textor (1963, 1967) used a computerized pattern search and table translation technique for identifying significant correlations between a large number of political and other environmental variables in some 115 of the world's polities. For the comparative study of development processes this survey can serve as a most valuable source of hypotheses for further research.

Additional Reference: Deutsch (1963).

Education and Political Development

It has been necessary to outline, however briefly, some aspects of the theoretical and conceptual background to the study of political development. Not only should this background serve as the framework within which current research on education and political development is conducted, but it should also indicate possible further avenues of inquiry which are not yet actively pursued. Considering the relative recency of this framework, it is not surprising that, at least on a comparative and cross-national level, empirical studies on the relationship between education and political development are as yet rather scarce. As was mentioned before, there is by now a considerable amount of research on various aspects of political socialization of American youth, and it should prove to be most valuable—as Greenstein (1965, pp. 168-69) pointed out—to replicate more of these studies in different sociopolitical contexts.

A search through the literature reveals a fair number of more or less penetrating, but on the whole rather global and impressionistic, accounts of relationships between education and politics—Lewis' (1962) work on Africa being a case in point. To be sure, some of these—and here again, Lewis is a good example—can be very useful in identifying problems which could be further and more rigorously analyzed. On the other hand, there is at this time only a limited number of studies which apply, on a sound conceptual basis, rigorous methods of empirical research to analysis of the relationship between education and political development. Several highly interesting studies which are now in progress, however, have come to this reviewer's attention.

The most significant single contribution to the study of education and political development to date has been Coleman's (1965) volume to which 17 social scientists of different area and discipline competence have contributed. It is noteworthy that this volume was published under the auspices of the Committee on Comparative Politics of the Social Science Research Council as one of its Studies in Political Development. While this underlines the importance accorded by this group to considering education as one of the important factors in political development, it also indicates the conceptual framework in which this volume is set.

Coleman (1965, p. 522) acknowledged the "reciprocal" nature of the relationship between education and the polity. With the exception of the last two chapters, however, the volume as a whole emphasized heavily the role of education as one of the "determinants" of political development and as "one of the principal instruments for change available to the polity" (p. 521). By way of conceptualizing this role, Coleman proposed three functions by which the effect of education on a political system can be perceived: political socialization, political recruitment, and political integration. Most chapters in the book elaborated, in the context of a country or a group of countries, on the relationship between education and political development in terms of these three functions and contributed important evidence on the usefulness of these categories for identifying the political effects of education under a variety of conditions. At a closer look, however, much of this evidence suggested that, in terms of the three categories established by Coleman, the roles of education in political recruitment and political integration can in many ways be regarded as special cases of an overall process of political socialization. It seems indeed helpful to conceive political socialization—"the process by which individuals acquire attitudes and feelings toward the political system and towards their role in it" (Coleman, 1965, p. 18)—as the most important and comprehensive category to apply to the analysis of educational contributions to the maintenance and adaptation of political systems. While political recruitment, in Almond's (1960, p. 31) terms, "takes up where the general political socialization function leaves off," political integration could be regarded as one of the possible targets to the achievement of which political socialization does or does not contribute. A very insightful and stimulating essay by LeVine (1963) treated political socialization in the context of culture change. LeVine suggested that ethnic group traditions act as a major source for the political orientations of the young in many developing countries and proposed ways in which both the content of these traditions and the "psychological mechanisms involved in their transmission" (p. 290) could be explored within the context of political socialization research.

As for actual inquiries into the basic processes and variables of political socialization, however, the present yield is far from satisfactory, especially if, for our purposes, we look beyond studies done in this country. Among studies which present data on political socialization as part of a broader analysis of political systems, Almond and Verba's (1965) five-nation study appears to be one of the most valuable sources to date. Of particular interest in this study are the findings about the relationship between various kinds of social participation (family, school, job) as a socialization factor and civic competence (i.e., individuals' perceptions of their own political ability).

Goldrich and Scott (1961; see also Goldrich, 1966), using a number of items from the instrument originally developed by Greenstein (1965), have collected interesting but somewhat dated evidence on political involvement, sense of political efficacy, and other politically relevant orientations of secondary school students in Panama, with the social background of the students being the main independent variable. More recently, Langton (1967) has presented some findings from a study among Jamaican secondary school students in which the significance of social homogeneity and heterogeneity in peer group and classroom environment for the political orientations of the students was explored and, it seems, established. Focusing on a different level of political orientation, Inglehart (1967) has studied schoolchildren in four European countries in an attempt to identify their attitudes toward European integration. When he compared his findings to available data on adult attitudes toward the same subject, he found that schoolchildren were consistently more favorably disposed toward European integration than their parent generation. It appears that studies such as Inglehart's can serve as valuable models for further inquiries about the processes of socialization into the international political system and its regional subsystems.

In addition to these and similar studies, there is one particular area of research in political socialization which has so far received a somewhat larger share of scholarly attention. This research is concerned with political attitudes and orientations of university students in a number of countries, and owes much to the insight and initiative of Lipset who, in an earlier article (1966b), had set up an exceedingly useful conceptual framework for the analysis of such problems. Under his editorship, a special issue of the *Comparative Education Review* (Lipset, 1966a) was devoted to student politics and contained a number of studies on the particular relationship between universities and politics in several countries, with an emphasis on Latin America, India, and some Western countries. The most recent outcome of Lipset's efforts in this field is another collection of studies on political attitudes of students in Latin America (Lipset and Solari, 1967). Among other studies on the political socialization of university students, the research done by Marvick (1965) and Hanna (1964) at West African universities is indicative of some of the peculiar problems of student politics in tribal societies. Further data from comparative studies in several African universities have been collected by, among others, Hanna and Barkan and await publication.

All of these studies have attempted to explore the political orientations of groups who are, as groups, associated with and part of some formal educational setting. Whatever important results these studies have provided, very little is said in them, except inferentially, about the particular role that these educational settings can be shown to play in the formation of political orientations. While this is by no means denying the importance of such independent variables as social background, it also implies the need for identifying and including characteristics of educational institutions and processes as further variables in the study of political socialization. One of the most promising studies in this sense is the "East African Education and Citizenship Project" which was conducted in Kenya, Uganda, and Tanzania under the direction of Prewitt. Some preliminary findings for Kenya and Tanzania have just become available (Koff and von der Muhll, 1967). From the way in which the project has been designed and from such evidence as we have at this time, it can be expected that this study will shed considerable light on some of the ways in which particular properties of educational institutions are demonstrably related to political attitudes prevalent among their student populations.

Several other studies more or less related to the general problem of socialization have provided important additional information on different aspects of the relationship between education and political development. The political significance of the national language question in multilingual political systems, for example, has been dealt with by LePage (1964). In a carefully selected and commented translation of textbooks for adult education in Cuba, Fagen (1964) indicated the usefulness of a systematic analysis of teaching materials in terms of their political message. The triangular interaction among church, state, and education is the topic of a recent collection of studies from various African countries (Scanlon, 1966). Studies such as the ones collected in this volume demonstrate the need for extending research on education and politics to include intervening influences originating in other systems of the society.

The value of historical approaches to studying the relationship between education and politics is still impressively represented by McCully's (1940) now almost classical study of English education and Indian nationalism. More recent studies by Foster (1965) in Ghana and Abernethy (1965) in Nigeria have combined a thorough historical analysis with the results from empirical survey data and have thus set a model for further studies in other parts of the world.

Additional References: Dawson and Prewitt (in press); Fischer (1961); Lyman (1965-66); Pye and Singer (1965); Roach (1967); Weiler (1964).

Conclusion

As this review has tried to show, the study of the relationship between education and political development has just begun to scratch the surface of an exceedingly complex phenomenon and poses many more questions than it is as yet able to answer. Major help in conceptualizing the relationship has come from recent efforts in the field of comparative politics to establish a framework for the analysis of political development, and from the limited research experience available at this time it can be said that this approach has proved its initial usefulness. Much more empirical research will be needed, however, before our present theoretical propositions about the effects of education on political development can claim any predictive validity.

Abernethy and Coombe (1965) have outlined some of the issues that await investigation: the political implications of the unemployment of school-leavers; the political role of teachers; the questions of linguistic diversity, of curriculum policy, and of religious schools; and many others. Some of the weaknesses of current research on political socialization, especially with regard to educational variables, have been pointed out. A fair number of these issues have been studied in this country to a much greater extent than anywhere else. One possible conclusion, therefore, would be to replicate, with appropriate conceptual and methodological modifications, the more promising of these studies in other countries so as to build up a body of cross-national evidence on the interaction between education and politics under a variety of sociopolitical circumstances. Only on the basis of such evidence can meaningful comparative analyses be made and the development of theory progress to the point where the role of education in political development is sufficiently clarified to make sound policy decisions possible.

Because of the present state of inquiry into the relationship between education and political development, this review has considered almost exclusively the work of political scientists. It is hoped that, by outlining some of the contributions which political science has made in this initial phase of exploration and conceptualization, more educational researchers will become aware of the exciting possibilities which the study of the political dimension of education has to offer. There is good reason to believe that current research by political scientists on education has a great deal to gain from the competence and talent available in the educational profession.

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CHAPTER IV

Education and Social Development

DON ADAMS and JANET ADAMS

Definition of Social Development

A discussion of social development involves certain problems of definition not present to the same degree in the use of the terms *economic development* and *political development*. The boundaries of the term *social* are vague, and there is confusion as to when a particular institution or activity is economic and when it is social. In UNESCO discussions of development, for example, social development has been contrasted with "traditional," "static," and "preindustrial" states of society and thus defined in terms of that social change which results from industrialization and the impact of scientific and technological advance. Thus, Marxism with its emphasis on the primacy of economic-technological factors is an example of one theory—some might even say the only extant theory—of social development.

Adams and Farrell (1966) defined social development essentially as societal development or "that kind of social change which is marked by emphasis on planning mechanisms to achieve desired types of complexity." Social development, however, has also been viewed by Aron and Hoselitz (1965) as the "increasing moralization of human behavior and thought"—thus placing values as the central consideration. The United Nations Research Institute for Social Development has defined "social" (1966a) as "everything that refers directly to the conditions in which people live"—a definition which hardly seems useful for analytical purposes—and has used (1966b) the composite "level of living" index (made up of social welfare indicators) to identify the primary social end being sought by development programs. This latter usage, equating social development with the improvement of social services, frequently may be found in governmental and international reports and in the literature of applied social sciences. Thus in terms of "policy instruments," economic policy largely consists of measures to raise national production and to increase the flow of money; social planning becomes planning for health services, consumer goods, and education services.

An earlier issue of the REVIEW (AERA, 1967) gave attention to research on education and social welfare. The concern here, however, is with linkages between the educational system and certain broad societal changes which are requisites or concomitants in the general process of development. Studies on education and social structure were treated by the aforementioned REVIEW and will not be included. Moreover, even though the the industrialized nations of Western Europe, North America, Australasia, and Japan may be viewed as "developing societies," the attention here arbitrarily is largely limited to the less developed nations.

Five types or groupings of studies will be considered: general studies whose treatment of education and development is so broad and includes so many different aspects of the development process that they defy precise classification; and four other categories concerned with the relationship of education to the process of social mobility, community development and national integration, urbanization, and population change. Studies concerned with the interrelationships of schooling and value systems receive some treatment in each section, although the bulk are placed in the section on general studies.

Additional Reference: Adams (1965).

General Studies of Education and Development

Social development defined in terms of increased social differentiation or in terms of universalistic and achievement patterns of value orientation recently has been subjected to much analysis and, to less extent, measurement in the social sciences. Hagen (1962) accounted for social development largely in personality terms; McClelland (1961) saw the key to rapid social progress in terms of the presence of motivation (need for achievement in social groupings); Lerner (1958) regarded development in terms of empathy or the ability of individuals to project themselves psychologically across class lines.

Attempts at the measurement of social development made by Naroll (1956) and Marsh (1967) relied on quantifiable indicators of what they considered to be key elements: level of urbanization, social stratification, etc. Only limited attention was given to formal education in the above studies. Allen and Bentz (1965), however, identified education as one of four underlying components of their index. McClelland (1961) held that achievement motivation could be explicitly taught and suggested that curriculum content might be important in this regard. Lerner (1958) gave attention only to literacy as an educational factor which links to the development of empathic capability.

Some efforts have been made to hypothesize stages of educational development which parallel levels of general societal development. Thus Beeby (1966) described four stages in educational systems: dame school, formalism, transition, and meaning. While rich in insight into the educational problems of developing societies this study is not particularly helpful in its avowed aim of being a starting point for a theory of educational change. There is, moreover, at least a modicum of truth in one reviewer's complaint that Beeby viewed economists as ogres and educators as Florence Nightingales. In contrast to Beeby's "qualitative" model, Laska (1964) built a quantitative model of educational development, suggesting that there may be an evolutionary sequence for the optimum development of educational systems. In the Laska model the first stage requires a limited amount of higher education, the second stage achieves universal primary education, and the third stage is characterized by a vertical expansion of school enrollments which will hopefully eventuate in universal secondary education.

There have been several attempts to enumerate the general contributions of the educational system to developing societies. Reportorial and statistical accounts of education in many of the less developed nations have been published by the U.S. Office of Education (USOE). These are typically in the form of surveys of the existing education system or of some subsystem of education. Because of the exceedingly large number of such reports and because they typically do not represent research in depth, they will not be covered here. Drawing from extensive personal experiences, Curle (1963) offered a general discussion of education in the underdeveloped nations and contributed a number of insights into educational and training problems as well as perspectives on the nature of underdevelopment in general. To say that this book seems a bit outdated only five years later is a reflection of the dynamism of development studies over the past few years rather than an indictment of the quality of Curle's efforts. Hanson and Brembeck (1966) and Cowan, O'Connell, and Scanlon (1965) edited collections of readings covering a wide range of problems in development education. The former recognized no geographic boundaries, while the latter limited selections to African education. The editors did an excellent job in their attempt to be inclusive; this, however, is also the shortcoming of their books, for mixed with careful scholarly analyses are hortatory political statements.

In a study sponsored by the U.S. Agency for International Development (USAID) and involving social scientists from a number of disciplines, several substantive and methodological problems in the study of education and social development were considered. The report of these analyses was edited by Adams and Farrell (1966) and contained chapters on education and social mobility, education and national integration, population change and education, and education and behavior change. The entire second half of the report was concerned with the development of improved ways of measuring educational output and educational change.

Three country-based historical and empirical studies of exceptional quality by Clignet and Foster (1966), Foster (1965), and Kazamias (1966) should be mentioned. The first two, in addition to offering broad analyses of education in the context of social change in Ghana and the Ivory Coast, focused on the relationships between certain social background attributes of secondary school pupils and the outputs of the educational systems. Because they were based on field study as well as historical analyses and reflected the careful use of research techniques of the social scientists, these studies are almost unique, and their contribution to the literature on education and social development is indeed substantial. In another significant study involving both historical and empirical analyses, Kazamias' well documented treatment of Turkish education examined the entire system in terms of both past development and contemporary function; however, greatest emphasis was placed on the *lise* (academic secondary school) which Kazamias viewed as occupying the pivotal position in the process of social development and modernization.

Medlin, Carpenter, and Cave (1965), drawing from the disciplines of history, sociology, and psychology, examined at length education and social change in Uzbekistan. They sought particularly to define the range and means of influence exercised by schools and teachers as this comparatively underdeveloped republic under Soviet leadership proceeds in transition to modern society.

There are a few general national and cross-national studies linking education to the pattern of attitude and value orientation associated with socially developed societies. Silvert and Bonilla (1961) analyzed the interrelationships among formal education, intergenerational occupational mobility, and certain "modern" attitudes in Argentina, Brazil, Chile, and Mexico. An important preliminary finding was that the impact of education, particularly at the higher levels, on the creation of modern attitudes and values depends on the type of occupation for which the student is being prepared. That is, the values and attitudes which characterize the occupational group constrain the effects of formal schooling. Elder (1965) tested the effects of parental dominance on the development of achievement potential by investigating the association between perceived parent-adolescent relations and the likelihood of reaching secondary school in the United States, Great Britain, West Germany, Italy, and Mexico. He concluded that parental dominance in adolescence was negatively associated with the probability of the child's reaching secondary school in all five nations studied even when other variables associated with educational achievement (size of birthplace, religion, and social class) were controlled; however, under conditions indicating a lack of educational opportunity, parental dominance did not retain its effects. Elder further concluded that the association between parent-child relationship and education should be weakest among lower class adults and strongest among middle class; and that in nations where educational opportunity is limited, the effects of parental dominance on educational attainment would be weaker. Jahoda (1961) attempted to assess the balance of traditional versus Western values concerning family patterns, adherence to traditional customs, tribal loyalty, etc., in one section of the literate community in Ghana. Classifying his 550 respondents in terms of high level of education (any education beyond primary schooling) and low level (primary schooling only) he used questionnaires of agree-disagree statements and hypothetical situations to determine the degree of Westernization of the respondents. Results of the investigation indicated that on the level of adherence to general traditions of the community (those associated with birth, marriage, death) little difference existed between illiterate, low education, and highly educated groups; however, in the other value areas investigated, those Ghananians with a higher level of education exhibited significantly more Westernized attitudes. Nasatir's (1966) study of 1,700 university and nonuniversity youth in Argentina indicated that urban would-be professionals were secular, pragmatic, and much less committed to the ideal of public service and personal sacrifice than were their rural counterparts. These attitudes appear to develop outside the university rather than within it. Hyman, Payaslioğlu, and Frey's (1958) survey of students in two colleges in Turkey also demonstrated that higher education has little influence on values or changes in attitudes. Clark (1962) produced evidence from a survey of students in U.S. colleges which suggested that in the Western, highly industrialized nations, the level of education does definitely influence student attitudes, i.e., the higher the education, the more liberal the attitude will be.

The relationship of education to the development of so-called scientific or technical attitudes received attention by the United Nations (1963) in a Conference on the Application of Science and Technology for the Benefit of the Less Developed Areas. Participants in the Conference voiced their opinions concerning problems and possible solutions in creating scientifically oriented attitudes and supported these opinions with some examples and research findings from their respective nations. In a well written description of personal experience in Nepal, Dart (1963) identified some of the barriers confronting the introduction of science and its supportive attitudes in a region with preindustrial values. Shils (1966) enumerated and evaluated the kinds of science research and science education needed in developing nations. Brembeck (1962) outlined briefly the problems stemming from traditional values and attitudes and some of the related problems concerning standard educational practices, i.e., rote learning, etc., which plague attempts to change education to meet modernization goals.

The attitudes of the Puerto Rican populace toward the role of education in shaping social development was examined by Brameld (1959). From extensive interviews with and questionnaires of 20 "grass-root" respondents and 16 "national leaders," he reported on their views of the proper relationships between education and such aspects of the culture as family, class structure, values and attitudes, national integration, religion, etc. Extending this study by means of his own philosophy and research, he made several proposals regarding education's most effective function in a modernizing society. The study is wide ranging in terms of aspects of culture considered; however, the sample was small and the methodology limited in scope. Holmberg (1960) described the change in the value placed on education by the inhabitants of a Peruvian Indian village as a result of an experimental program conducted there under the auspices of Cornell University.

Additional References: Ashby (1966); Association for Latin American Studies (1966); Scanlon (1966); Whiting (1963).

Education and Social Mobility

Social mobility is a multifaceted concept usually measured by occupational movement. It may be a result of, or a contributor to, development. Indeed, for societies seeking greater equality of opportunity, social mobility becomes a goal in its own right. As a number of studies indicate, education, or at least a certain kind or level of education, may be an important means for the promotion of social mobility.

Fox and Miller (1965) employed multiple regression and partial correlation analysis to investigate a complex of possible determinants of social mobility in 12 "developed" nations. Intergenerational outflow mobility between manual and nonmanual occupations was related to five variables: gross national product per capita, school enrollment as percentage of population aged 5 to 19, political stability, urbanization, and achievement motivation. Results indicated that these five variables together account for 80 percent of mobility variance, with education demonstrating the highest relationship to upward mobility and ranking second as a source in explanation of variations in upward mobility. Havighurst (1958) investigated the interrelations of education, social mobility, and social change in Australia, Brazil, England, and the United States. He suggested that industrialism leads to social mobility which in turn leads to individual and group mobility and that education was an important factor in affecting the pace of all others.

Two Brazilian studies found education to be an important contributor to social mobility. Havighurst and Moreira (1965) demonstrated that the desire for and achievement of social mobility were viewed as the primary factors influencing the function of education as a cultural institution in Brazil. Considerable attention was given to the historical development of education, description of contemporary curriculum, and the influences exerted on education by such institutions as family, church, and state. However, emphasis was placed on the economic and status rewards to be attained through education, a value which is apparently held in common by the Brazilian populace and the authors. In a related but limited study of Brazilian secondary education, Havighurst and Gouveia (1966) identified the two major societal functions of secondary education as the contribution to the economic development of society and the increase in the degree of social integration of the society. Drawing on data obtained from questionnaires distributed to students of both upper and lower cycles of the middle school, they determined that differences in attitudes, opportunities, school attendance, etc., were directly related to differences in socioeconomic status, in sex, and in rural-urban surroundings. Of particular interest was the "index of opportunity through middle schooling" which was developed. The conclusion reached was that Brazilian secondary schools were meeting the socioeconomic demands identified; when compared with the United States, however, the proportion of youth who benefited was small, and working class opportunities for social mobility or social integration were quite limited.

A number of studies based in Middle Africa also emphasized the significance of education for social mobility and the value placed on education largely in terms of its mobility function. Koff (1967), for example, conducted a survey of pupils from 33 primary schools in Kenya which indicated that education was valued primarily as a means of social mobility and that the skills taught in school influenced occupation preference. Foster's (1963) survey of social recruitment based on a stratified random sample of Ghananian secondary school students revealed that there were positive relationships between secondary school access and the variables of paternal education, paternal occupation, and urban origin; however, compared to Western (British, primarily) society, secondary education in Ghana was seen as "extraordinarily successful in drawing on a very wide segment of the population."

Studies by Anderson (1961), Smith (1960), and Wang (1960) suggested that education is not always the major contributor to social mobility in either the developed or less developed societies. Anderson concluded in his study of data from Sweden, England, and the United States that factors other than level of education play a major part in mobility. Although the few individuals with superior education have a high probability of upward mobility, the upwardly mobile group consists mostly of people with typical, rather than superior, education; many sons of upper class fathers, even though they have a great deal of education, are occupationally downwardly mobile. He suggested that the type of schooling provided makes a difference in the amount of mobility provided, i.e., elite schooling may be dysfunctional for elites; furthermore, the degree of selectivity practiced by the school system is an important factor in determining the vertical mobility of its graduates. Wang described another instance in which social mobility was curtailed by education. The abolition of the civil service examinations in China and the substitution of the Western school system, topped by study abroad, greatly increased the cost of education and thus substantially decreased opportunities for social mobility. Smith's study of Jamaican youth's vocational aspirations indicated that while schooling is a means for social mobility for some of the youth, it creates unrealistic vocational aspirations for many of them, thus resulting in a high degree of *anomie*.

Additional Reference: Goldrich (1964).

Education, Community Development, and National Integration

National integration is defined here as the process by which small communities become nationalized and their inhabitants identify themselves with the larger state. This is a process particularly crucial in the earlier stages of development in new states which attempt to develop a national consciousness, and in older underdeveloped nations where such consciousness has been limited to a small elite. Closely allied to this concept is Silvert's (1963) definition of nationalism: a social value which entails acceptance of the state as the impersonal and ultimate arbiter of human affairs. His typology of patterns and stages which this phenomenon assumes under varying historical, social, and economic conditions provides a helpful delineation.

Geertz (1963) hypothesized that the people of new states are simultaneously animated by two often opposed motives: desire for personal identity and desire for a modern nation. Being national often means loss of personality. He presented a typological classification of five patterns of "primordial diversity," supported by extensive examples of the problems arising from these primordial issues. For example, in the school system, conflicts can be seen in disputes over language of instruction, religious versus secular orientation of curriculum, and regional location of higher education institutions. In his first chapter Sigmund (1963) identified and analyzed the beliefs held in common by leaders of developing nations, listing as the first two the creation of loyalty to the nation as it emerges into a functional unity and the recognition of the value of the national educational system to develop loyalty to the nation. He devoted the remainder of the book to reprinted statements by political leaders of Latin America, Africa, the Middle East, and Asia. Peshkin (1966) presented a generalized description of the common problems encountered by developing nations in extending and reforming education to meet what he identified as their major goals: economic progress and national integration. Hunt (1966) described from a historic perspective some of the problems evolving out of ethnic diversity in the drive for national unity among developing nations. He identified common problems in directing education to desired national needs in terms of "educational serendipity," purpose, extent, and effectiveness of each level of schooling, and factors limiting the schools' success. The value of national integration to a developing society was emphasized by Fillol's (1961) study of Argentina. In attempting to isolate the social and cultural factors which accounted for Argentina's recent stagnation in development, he pinpointed as a major cause the fact that the Argentine people are a "conglomeration" rather than a community. Ki-Zerbo (1966) approached the problem of education as a means for national integration in terms of curriculum reform. He identified specific subjects which should be emphasized in order to Africanize modern education in Africa, i.e., African geography, etc.

Although there are many definitions of *community development*, this amorphous term is usually taken to mean at least the growth and improvement of participation in national life. Thus community-national articulation has been viewed as a measure of community development. Young and Young (1962) compared two recently devised Guttman scales of community organization which indicated that regardless of culture content, communities follow a cumulative unidimensional sequence of growth in the direction of greater articulation with the larger urban-industrial society. They identified three major stages of this sequence: local autonomy, representative group level external contacts, and interpenetration of community and national systems.

Dobyns, Monge, and Vázquez (1962) reported on the results of the Cornell community development project at Vicos, Peru, in terms of four social structural levels of impact: community, neighborhood, region, and nation. Although the community development program had been extended to nine adjacent communities by means of the rural peasant school system radiating from Vicos, the resistance to the program by landed proprietors was powerful enough at both neighborhood and regional levels to curtail effectiveness and block integration. At the national level the program received governmental support and was a model for other community development and Indian integration programs.

Education presumably can play many roles in the processes of community development and national integration. However, the degree to which education does or can assume these roles is still open to question. Batten (1959), Chance (1960), Hanks (1958), Nash (1965), and Sibley (1960-61) in their community studies reached conflicting conclusions about the contribution of the school. Batten presented evidence from Indian, Bolivian, and American Indian communities to support the thesis that schools can be effective means for national integration only when its purposes are understood and supported by the community. Sibley analyzed the failure of community school-village improvement programs in the Philippines and attributed this failure to the lack of recognition by the school planners of other factors in the society. Hanks identified the cause of a rural Thai community's indifference to modern education as being the traditional view of education which judged it according to its contribution to morality or to the aid of farmers. The curriculum was functionless in the eyes of the community since it served neither purpose, and the concept of social mobility through education was not recognized by the rural Thai. Nash, in his well documented study of village schools in Mexico, Guatemala, and Burma, concluded that the school is an ineffective agent for national integration unless it is removed from community influences, i.e., by means of boarding schools, or unless the influences for processes of national integration emanating from other societal institutions are already strong.

The nature of rural education and the extent to which the curriculum in rural areas should be biased in favor of local vocational concerns are topics of considerable controversy in development education. Anderson (1967), Griffiths (1967), and Hunter (1967) made field studies of rural education in East Africa but were not entirely in agreement in their conclusions. Hunter concluded that expanded and more economically relevant primary education accompanied by education programs for adults and school leavers, "village-college" opportunities, and the Youth Service were important to African rural development. Griffiths observed that special rural schools or curriculum would be detrimental to national unity and that dysfunctional attitudes were the major problems. Anderson employed questionnaires, interviews, and extensive personal contact with primary school students in three rural areas of Kenya to examine the problems of rural teen-agers confronting the conflicting influences of traditional community and pull of the modern city. His results indicated that while more research was necessary, education should not be the focus of attention in attempts to solve these problems since the crucial socializing influences of youth are found outside the school.

Drawing from the data supplied by Nash's (1965) study, and from both theoretical and empirical research of several other social scientists, Safa (1966) developed a theory of the process of community-national integration by which she related the role of education to this particular aspect of social development. Not only was the school's present role identified, but possibilities for its assuming a more meaningful part in this process were suggested. For example, use was made of Wolf's (1956) concept of open and closed communities and of the Young and Young (1960) scalogram analyses of Mexican village-level institutions which indicated that as the community is incorporated into a more differentiated social structure, the basis of consensus is widened to include national-level institutions and ideology; and that the more differentiated a community's institutional system, the more receptive the community is to change and to further institutional differentiation. The implications which Safa derived for education were that the open community, being more differentiated at both structural and performance levels, is likely to be more receptive to education, viewing it as a means of upward mobility and as a means of learning more about the larger society. To support another facet of her theory, Safa drew on the work of Friedl (1959, 1964) and Wolf (1956). Wolf's research supported his concept of the importance of nation-oriented groups within the local community who act as mediators or "brokers" between national levels of society and the community. As a result of her study of Greek peasantry, Friedl (1964) developed the concept of "lagging emulation," the process whereby lower prestige groups or newly urban migrants imitate what they conceive to be the behavior of more prestigious groups;

in so doing they often emulate behavior which is obsolescent and at the same time influence the behavior of rural or less prestigious groups with which they still remain in contact. Thus, lagging emulation provides a mechanism of transition by which rural peasantries can become gradually integrated into a national culture and society. The implications for education which Safa derived from these studies were that the school can provide a broker class in the local community. Not only does the schoolteacher act as a broker and model for emulation, but more highly educated students who become community leaders, as well as those who migrate to the city but do not break village ties, also can assume this role.

The importance of the broker role in achieving national integration is supported by Honigmann's (1960) study of a West Pakistani village. The extremely high percentage of youth from this village who moved through educational channels into "broker" positions both within and outside the village was noted; however, the causes of this phenomenon were identified as primarily economic, and the school's role was only briefly discussed in terms of its being an instrument used by the youth to gain the required skill or degree. Collins (1960) examined the community leadership role of primary school teachers in Africa and the West Indies by describing historically the rise and fall of their prestige and emphasizing contemporary forces which tend to lower their status. He suggested that the teacher's prestige in the past was less related to the value placed on education than to the power he was able to control in the community by virtue of his leadership role. In the present situation, however, although the teacher is expected to participate in various community organizations, he is no longer considered a community leader.

Only a few cases of the planned role of the school in directed social change at the community level have been reported. Niehoff (1966) presented 19 case studies of successful and unsuccessful efforts to introduce some facet of social change in communities of Latin America, Africa, the Middle East, and Asia. He identified reasons for success or failure of each project in terms of his own concepts of social change and with special emphasis on the role of the innovator and his techniques. Formal education and the community schoolteachers received attention to varying degrees throughout the studies. In a study of Bolivian villages, Patch (1963) described three ways in which the schools operated as forces for national integration: (a) peasants supported education as a means for social mobility; (b) the organizations which they formed to build schools developed more extensive interests and social and political power; and (c) the centralized character of the Bolivian education system resulted in emphasis being placed on national history, institutions, and problems. Holmberg and Dobyns' (1962) description of the Cornell community development project in Vicos, Peru, more closely identified the role of education in community development. By providing the means for villagers to build their own school building, community interest was awakened; by providing free lunches, attendance was increased; by providing better teaching, schooling became more effective, and the resulting literacy improved communication between isolated villagers and the outside world. Both positive and negative effects of employment of mestizo teachers in the Indian villages were identified, and the broker role of the teachers was briefly mentioned.

The interrelationships of literacy and other factors influencing the social development process have received attention from several sources. Rogers and Herzog (1966) examined interview data from residents in five Colombian communities to determine the relationships between scores on a test of functional literacy and other indicators. Many functional literates had fewer than four years of education, but only one illiterate had four or more years of schooling. Literacy was generally found to be related to mass media exposure, empathy, agricultural and home innovativeness, achievement motivation, size of farm, number of trips to urban centers, amount of political knowledge, and sociometric opinion leadership; and to be more characteristic of children than of adults. Joshi and Rao (1964) tabulated the results of surveys of 12 villages in India which showed the relationships of sex, age, caste, class, and rural-urban residence to the attainment of both literacy and higher levels of education. Of particular significance was the conclusion that degree of literacy is more sharply associated with caste status than with economic position; however, within castes, economic position showed a positive direct correlation with literacy. Tibawi (1958) concluded from his study of mandatory Palestine that the retention of literacy was very heavily dependent on the social environment of the literate; he demonstrated that five years of primary education was the minimum for literacy retention in those villages which had experienced greater social change and were in close contact with the urban or industrial areas of the nation, whereas five years was insufficient in the more remote villages. Moreira (1960) described a literacy experiment in Brazil begun in 1958 in which three fundamental education pilot projects attempted to integrate local leadership values and support to eradicate illiteracy.

Education can also be viewed as dysfunctional in the process of national integration. A conflict easily can arise between the goals of development (efficiency in production) and the goals of national integration (equity in opportunity). Gusfield (1966) cited several detailed studies to support his thesis that education in India is being employed as a means for achieving these two conflicting goals. Unfortunately his rather rambling discourse failed to demonstrate the nature of the efficiency-equity conflict. In a well documented description of attempts to use education as a means for national development in Laos, Halpern and Tinsman (1966) identified lack of national integration as a major problem and suggested that contemporary Laotian educational programs have served to intensify ethnic and social divisions. Primary education has undergone expansion and agriculturally based curriculum reform; however, the reformed curriculum will not equip students for entrance into the French-dominated secondary schools and will thus widen the gap between the urban Lao elite and the rural Lao and/or other ethnic groups. Ruscoe (1963), through an extensive historical and empirical study, documented the dysfunctionality of the Jamaican education. This dysfunctionality was promoted on the one hand by the general view of the populace toward education as a means of escape from one's position in life and on the other hand by a failure of the educational system to accept new functions in the face of disintegration of the family and other social institutions.

In contrast to studies which stressed the value of education in promoting national integration, Newman and Oliver (1967) suggested that in post-industrial societies such as the United States, education should become wholly community oriented as a means of counteracting the concern with technological efficiency which has served to dehumanize society.

Additional Reference: Elam (1965).

Education and Urbanization

The social changes subsumed under the term *development* usually occur first, and subsequently are more pronounced, in urban areas. Urbanization thus may refer not only to urban growth but also to the broad social transformation which accompanies it. Although the increase in urbanization is strikingly marked in the developing countries, it is also a continuing process of the industrialized nations. Many of the recent studies of urbanization have focused on social change in personality structure, family structure and function, values and attitudes (toward work, money, nationalism), and aspirations and concepts of availability of opportunity for social mobility. Obviously the institutions which undergird and integrate these components must, and do, change. The role of the schools in the urbanization process has been roughly designated as that of provider of skills and of new attitudes and values commensurate with the urban way of life.

Studies which discuss general theories of urbanization provide a background for an understanding of the relationships between the social changes intrinsic to the process and role of education. Anderson (1959) described the ecological, economic, social, and political aspects of urbanization. A world perspective was achieved by using the urbanization process in the United States as a basic referent and comparing it with the nature of this process as found in other areas of the world, particularly the developing countries. Reissman (1964) critically analyzed a wide range of studies and theories concerning the city which he classified under four types: utopian, empirical, ecological, and theoretical. This typological model required the analysis and measurement of four variables: the growth of cities (which serve as ecological arenas for change), the growth of industry (which supplies the economic basis and character), the emergence of a middle class (which supplies the necessary leadership), and the rise of the ideology of nationalism (which supplies the rationale, legitimating purpose, and social cohesion that can mobilize a population behind the change). Of particular relevance is the postulate that functional relationships exist between the choice of emphasizing one variable and the consequences of this emphasis for other variables of the society. The consequences of particular emphasis have been demonstrated by societies which have previously experienced industrialized urbanization. Drawing on the Reissman model, Adams and Farrell (1966) related the role of education to each of the four urbanization variables. Particular attention was given to demonstrating the relationship between each of the variables and education as well as the results of the choice of a particular educational emphasis. For example, an educational policy designed to provide academic or technical skills which permit enlargement of the middle class might not allow priority to a program for nationalism to the masses.

Studies linking education to urbanization within the development context usually focus on either the effects of the urbanization process on education or the quantitative and qualitative differences in rural and urban educational opportunities. Kahl (1959) briefly reviewed research concerning the changes brought about by urbanization in such areas as family, career, stratification, population, national integration, and education. He suggested that the result of urbanization is a complex division of labor which demands greater access to an education system and curriculum reform. Hauser (1961), in the edited results of a UNESCO seminar on urbanization in Latin America, offered his own urban theory and presented selected microstudies by several social scientists which attempted to apply particular aspects of the theory to Latin American urban areas. Two of the selected studies made direct reference to education. Germani's (1961) investigation of residents of a small urban area in Buenos Aires classified urbanites as city born, early migrants, or recent migrants and compared the differences among the groups in terms of a series of cultural variables. As might be expected, it was discovered that the educational level of all groups dropped as age increased, and recent migrants had the highest illiteracy rate. Mar (1961) identified educational opportunity as one of the major reasons for rural-urban migration in Peru and cited case studies to demonstrate the degree of sacrifice undergone by families who moved to the city so that their children could be better educated. General conclusions reached by the seminar concerning the relationships between education and social development in urbanization supported the commonly recognized concepts that education has a direct positive effect on social mobility and that it is an important institution for the adaptation of rural immigrants to city life. A less commonly accepted idea was that since increasing education means greater social mobility and since opportunity for social mobility is concentrated in cities, urban rather than rural education should be heavily supported. In typical UNESCO fashion, emphasis was placed on the need for expanding adult and literacy education both through the schools and through other social, economic, and political institutions with which urbanites would come into contact. Although this book is valuable for both the theory and the empirical research included, more attention to the connection between the two would have been welcomed.

Anderson's (1963) concept of the most effective use of education in the development process also stressed the need for concentrating educational efforts in the dynamic urban areas and, in addition, among those groups of the population most likely to be sources of emulation and diffusion. He argued that attempts should not be made to equalize educational standards and opportunities. Phillips' (1959) investigation of rural to urban migration in Iraq revealed that although free social services were far more plentiful in the urban area, new migrants failed to utilize them. For example, government schools furnished free clothing and food, but only 14 of 95 boys of primary school age in the sample were attending school, and no girls were attending. The author identified the causes as ignorance about the existence and value of services, lack of money for such things as shoes and transportation, fear of government, and confidence in anonymity. Less than 1 percent of the sample listed schooling as a major need. Baker and Bird's (1959) investigation of the social and economic effect of urbanization on the position of women in Africa revealed that the priority value which was being given to education by urban Yoruba females was due to both the increased independence of women and the need for individual financial security

Population Change

Research on the effect of education on population change as a feature of social development can be classified under two main categories: the relationship between education and fertility, and the relationship between education and migration. The effects of education on fertility within a common social grouping has been the subject of several studies. Tabah and Samuel (1962) concluded from their survey in Santiago, Chile, that education had a slightly depressing effect on fertility within economic classes; however, the effect was more pronounced in the poorer and richer classes than in the middle group, and the decline did not amount to a whole child until the level of schooling had reached six years. Berelson and Freedman (1964) showed in their survey of an urban area in Taiwan that women 35 to 39 years of age and at all educational levels were having more children than they wanted, but that better educated women wanted and had fewer children than those with less education. Yaukey's (1961) study of 900 Lebanese women revealed that educational effects on fertility were small in rural areas but that among younger women in urban settings an inverse relationship existed between amount of education and family size. Hawley and Prachuabmoh (1966) reported as a result of interviews in a predominantly rural area of Thailand that women with more than five years of schooling had fewer children by the time they were over 40 years of age than did those with less than five years of education. A major portion of Majumdar's (1960) data-laden study of Kanpur, India, dealt with a family planning inquiry which indicated that while there was no appreciable difference among attitudes of women with primary education and those with no education in number of children desired, women with secondary or higher education desired at least one child less than the city average. Although data were collected on other factors influencing size of family, no correlations or comparisons were made.

Drawing from their succinct review of methods and extent of population control in 24 developing countries, Kirk and Nortman (1967) identified urbanism and higher levels of education as the two major reasons for the more successful programs. However, they suggested that these factors are becoming less important because of improvement in contraceptive technology and interest in practicing family planning which is so widespread among the populaces that it exceeds the efforts of governments to provide effective programs.

The value placed on educating children in Ghana was identified by Caldwell (1967) as one of the two major factors which have led to the desire to control family size among the rural residents of that country. His research also indicated that there are direct relationships among positive attitudes toward fertility control, level of education, and value placed on education.

Perusal of the very limited research which explores the relationships between types of schooling and fertility generally seems to indicate that variation in types of schooling has little effect on fertility. However Westoff (1962) cited data to show that Catholics in the United States who go to parochial school from primary level through college are more prolific than Catholics who attend secular schools.

Some of the more significant conclusions reached by Bjork (1966) in his comprehensive study of population change indicated that when countries are already somewhat urbanized and have a fairly large proportion of the population with a relatively high median of school years completed (six to seven years), then educational gains which occur may act to depress fertility. In more undeveloped nations, however, such educational gains are not likely to depress fertility to a significant degree. Nevertheless, educational efforts aimed directly at fertility decrease may have important effects in these less developed areas. It was emphasized that all generalizations concerning linkages between population and education must be regarded as tentative, for, among other reasons, the research thus far undertaken in this area has utilized only crude and aggregated educational measures.

Conclusion

Many of the shortcomings of extant studies in education and social development are those of development education in general. First, the concepts of social change, development, national integration, urbanization, etc., are not highly refined and do not lend themselves easily to analysis and measurement. The studies of these processes are literally full of partially developed theories, inferences drawn from "ideal-type" models of primitiveness and modernity, and generalizations based on particularistic evidence. Nearly every study begs for elaboration and extension of empirical referents.

Second, the studies reviewed indicate the weakness of the state of educational studies. The crudity of the treatment of education can be seen from the fact that distinctions are rarely made among education, socialization, enculturation, and communication. Moreover, formal education is frequently treated as a homogeneous institution rather than as the differentiated, multifunctional system that it always is in literate societies. Broad studies of education and social change particularly are frustrated by lack of conceptual advances in education and the derivative difficulty in measuring educational change. For example, those measures of educational output typically used in describing educational development or in linking education to social development such as literacy, enrollments, or graduates are but crude aggregate measures which disguise as much as they illuminate in the educational process.

Third, the studies in education and social development typically reflect research interests of social scientists rather than educationists. This means, first of all, that educational insights are largely serendipitous effects of such studies. Moreover, even those studies focused on education give little attention to administrative procedures, curriculum, teaching techniques, and the like. If the studies are to link with broad policy and planning decisions, this is perhaps as it should be. On the other hand, pedagogical and intrasystem problems set in the context of development (and therefore requiring comparative treatment) should also be of great interest for the purposes of both research and policy making. It would appear, however, that the internationalists among professional educators are either too few or too much inclined toward viewing the "big picture."

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CHAPTER V

Concepts and Techniques of Educational Planning

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Despite a steadily expanding body of literature on the subject, there is at present little agreement on the dimensions or scope of the educational planning process. Indeed, since the interest in this area is of such recent origin, much of the literature has simply concentrated on defining terms and exploring alternative techniques for the preparation of national education plans. Consequently, as a recent bibliography compiled by the International Institute for Educational Planning (1964) demonstrates, educational planning research represents little more than a series of probes with a range wide enough to challenge even the most expert taxonomist. Studies span from an attempt by Harbison and Myers (1964) to delineate general educational strategies on the basis of international comparisons of student flow rates to the use of operations research and linear programing techniques for evaluating the student flow characteristics of a specific system (Organization for Economic Cooperation and Development (OECD), 1967b). Since the ultimate purpose of planning is to design educational policy, studies have also touched on such diverse items as curriculum content, design of physical facilities, methods for exploiting new sources of revenue, and cost implications of alternative educational technologies.

Obviously, this situation hampers a concise description and evaluation of recent research in the field. It is essentially for this reason that the scope of the present paper is limited to a review of some of the aggregate models and techniques that have been either suggested or actually used for the preparation of national educational plans, especially in the low income or underdeveloped countries. As will be seen, these models are primarily quantitative in both purpose and method. They are, nonetheless, representative of the research in the educational planning field and thereby provide a framework in which the more detailed studies can be viewed. To place this discussion in proper perspective, however, the elements of new interest in planning educational systems must be explored.

Characteristics of Educational Planning

Planning is fundamentally a technical activity related to the decision-making process. Its purpose in the context of a national educational program is to assess the implications of alternative sets of policy and thereby help decision makers choose that set which is most appropriate to the specified objectives of the program. In the sense that good decision making always clarifies alternative courses of action and seeks to satisfy predetermined targets, educational planning is not especially novel. There are, however, at least two characteristics of the new interest in educational planning which require a substantial technical effort at the point of setting policy targets and, hence, tend to set it apart from the more traditional definition of effective educational administration.

In the first place, recent years have witnessed an increasing emphasis on the need to design educational policy in relation to an overall set of objectives for economic and social development (OECD, 1962). This stems principally from research carried out during the last decade on formation of human capital and sources of economic growth. Even though these studies have been summarized in Chapter II of this REVIEW, it is worthwhile nonetheless to point out that their importance lies in calling attention to the investment feature of educational expenditures and the role that education can play in accelerating the growth in real output over time. Thus, in addition to being a fundamental end in itself, education is now also viewed as an important means or instrument for increasing a nation's economic and social welfare.

Once this relationship is introduced into the design of educational policy, of course, it becomes necessary to assess a variety of factors that previously may have appeared irrelevant. The most important of these is to evaluate whether the size and structure of the education system is appropriate from the perspective of national development objectives—or, conversely, to determine the educational capacity that will be "required" to permit a nation to reach its development targets. In financial terms, this amounts to assessing the size and composition of the total educational budget that will make an optimum contribution to economic growth. In either case, it is easily seen that a set of questions concerning current and future educational policy has been raised which requires substantially different criteria and techniques for evaluating alternative courses of action. Generally speaking, a major proportion of the literature on educational planning has been concerned with the design of such criteria.

A second important characteristic of the new interest in educational planning is that it has focused attention on the structural interdependence and efficiency of educational systems (OECD, 1967c). In response primarily to the concern for balance and consistency among various levels and types of educational programs, there has been a growing awareness that almost any decision in any part of the system has an impact on the entire educational structure. As a result, planners have tended to emphasize the need to view the system in a comprehensive fashion so as to account for the interdependence among levels and tracts and to ensure that there will be internal consistency among system relationships over time. Furthermore, planners also have tended to emphasize the efficiency of these system relationships. In particular, the view of an educational system as a set of input-output or production relationships which can be controlled in a way that will optimize the use of scarce educational resources is almost entirely a consequence of the recent interest in educational planning. While somewhat less research has been carried out on this particular aspect of planning, the work that has emerged appears to be more revealing than the counterpart research on the relationship between education and economic development.

It must be noted that although the aforementioned have been characteristic of almost all the work in the educational planning field, there has been a significant difference in emphasis given to each one in various parts of the world. This must be kept in mind because of the frequent references in the literature to the alternative approaches to educational planning, a summary of which can be found in Blaug (1967). One of the principal debates, for instance, has been over the extent to which the educational structure should respond to the social demand for schooling by students or their parents or should be adapted to economic and social requirements as measured by the educational authorities. The fact that certain countries have chosen one or the other of these possibilities is frequently interpreted as a difference in methodological approach, which in turn leads to an argument about which approach is the more appropriate from both a philosophical and technical point of view.

In a perceptive article on the experience of educational planning in Western Europe, Kelley (1966) argued that differences among countries in educational planning practices are due less to variations in methodology than to emphasis, and pointed out that the difference in emphasis tends to divide along the general line between economically advanced and less developed nations. In general terms, advanced nations such as Great Britain, Denmark, and Sweden have tended to emphasize a planning approach which allows the size and structure of the school system to be determined by the dictates of the "marketplace" and concentrates on the efficiency relationships between system inputs and output. Thus, while economic requirements such as needs for skilled manpower were considered in the design of policy, educational targets were primarily established on the basis of estimated changes in demographic characteristics and likely demand for school places. The less developed countries, on the other hand, have placed relatively more emphasis on making the relationship between economic objectives and educational investment requirements much more explicit. This results both from the severe resource limitations of these countries and from the fact that they anticipate greater structural shifts in their economic and social situation than do the more advanced nations.

While many planners would agree that both the social demand and economic requirements "approaches" must be used in the preparation of any country's educational plan, a rather substantial proportion of the research and actual planning exercises have been conducted in the underdeveloped countries where the emphasis has been predominantly on making the relationship between development needs and educational requirements as explicit as possible. The following paragraphs explore this work in some detail.

Use of Manpower Models in Educational Planning

Much of the work on planning education in relation to economic development objectives stems from the initial interest and impetus provided by the Organization for Economic Cooperation and Development (OECD) through its Educational Investment Programme and the Mediterranean Regional Project (MRP). Since the MRP has attracted considerable attention, it deserves special comment.

This project was carried out under cooperative agreements between the OECD and Greece, Italy, Portugal, Spain, Turkey, and Yugoslavia. Research teams comprised of local and foreign technicians were established in each country to prepare an assessment of educational needs during the period 1960-75 and detailed plans for action to satisfy these needs. The first phase of the project has now been completed, and reports for each of the six nations have been published (OECD, 1965b, c, d, e, f; and 1966). What is of interest here, however, is not the specific conclusions reached, but rather the common methodology used to ascertain at least the minimum economic requirements for educational expansion in each country. This methodology was initially described in Parnes (1962) and in a broader series of lectures delivered at an OECD Training Course edited by Parnes (1963). To understand some of the responses and research prompted by the initial phase of the MRP, it is worthwhile to describe briefly the steps involved in the basic planning methodology. These may be outlined as follows:

First, on the basis of a development plan or a systematic assessment of future levels of economic activity where no plan existed, production targets were established for each economic sector. Estimates of sectoral employment levels compatible with these targets were then made primarily on the basis of productivity trends. Then, within each sector, employment figures were allocated among occupational categories on the basis of international and/or interfirm comparisons to yield an occupation by industry matrix for the terminal conditions of the planning period. This matrix was subsequently summed by occupation to arrive at an estimate of the occupational composition of employment that would be "required" if sectoral output targets were to be fulfilled.

Second, these occupational targets were converted into educational qualifications to yield an indication of total employment distributed by levels and types of educational achievement. By assessing manpower supply conditions over the period of the plan, the required net additions to the labor force by educational qualifications were deduced. These net requirements were then specified in terms of graduates or "output" from the formal educational system for each year of the plan. Such output figures, then, constituted the principal criteria to be employed for planning the size and structure of the educational system over the course of the planning period.

The MRP has been a prototype for a number of planning exercises which attempt to design educational investment policy on the basis of the manpower requirements implied in a set of economic development objectives. A sizable number of such exercises are being carried out or nearing completion in a number of the developing countries in Africa, Asia, and Latin America (e.g., Harbison and Myers, 1965; OECD, 1967a; Platt, 1964).

Equally important, the MRP has fostered an increasing interest in manpower-education planning research. There is, for instance, a growing body of literature designed to clarify and refine the techniques for projecting manpower requirements. Döös (1963), Goldstein (1966), and Mangum and Nemore (1966) explored in a somewhat more concise manner the meaning and concept of manpower projections. Mehmet (1965) summarized the range of methods proposed or actually used in forecasting manpower requirements.

Within this context, several recent studies have concentrated on the use of international comparisons of industry-occupation-education matrices for projection purposes. Hollister (1964) considered the theoretical possibilities that there might be a uniform manpower "growth path" which countries at different levels of development could be expected to follow. He concluded that this was likely only under highly restrictive assumptions. Still, such comparisons are extremely useful to planners if the relevant data are available. Horowitz, Zymelman, and Herrnstadt (1966) attempted to overcome the data availability problem by collecting and cross-tabulating 225 occupations and 58 industries for 19 countries at different levels of development for at least one point in time. Furthermore, where data were available, they cross-classified educational attainments and occupational groups. It should be noted that behind this data-collection effort lay another and perhaps more important purpose of testing a hypothesis which is basic to manpower planning techniques: that a relationship exists between occupational structures and the level of labor productivity. Horowitz, Zymelman, and Herrnstadt found significant correlations in support of this hypothesis with data from the United States and other countries. Thus, it was concluded that the data presented in the study legitimately could be used for purposes of projecting manpower requirements.

Irrespective of the specific techniques used in obtaining a set of future manpower needs, the use of such criteria in educational planning requires converting occupational targets into requirements expressed in terms of educational qualification. The difficulties in making such conversions are illustrated in a study by Folger and Nam (1964) on the relationship between occupation and education in the United States. They showed that improvements in educational attainment within specific occupational categories were far more significant in explaining the increase in the educational levels of workers than was the change in the occupational composition of employment. Folger and Nam also showed that the relationship between education and occupation is getting weaker over time.

To aid planners in making such conversions, Blandy (1965) emphasized the need for constructing an occupational classification system that would show not only the education and training requirements for various occupations but also the extent of training needs and the possibilities for a person with a given level of training to move easily between certain occupations. An important beginning has been made on assessing the amount and type of education required for various occupational categories by Eckaus (1964) in his attempt to establish the educational requirements of different economic sectors. Eckaus measured the proportion of employees in each sector with different levels of "general educational development" and "specific vocational preparation" as estimated by the U.S. Bureau of Employment Security. Using data from the U.S. Censuses of 1940 and 1950, he found that there has been a general upgrading of both education and skill requirements of the labor force between these two points in time. Scoville (1966) used the same type of analysis to establish similar education and training requirements on an occupational basis and extended it to take account of the 1960 U.S. Census. He found that the rate of increase in educational levels of the labor force has quickened since 1950, although the occupational approach tended to produce quite different results from those found in Eckaus' industrial approach.

Variants of the Manpower Model

Much of the research prompted by the MRP and similar projects has been directed at eliminating some of the problems inherent in the logic of the basic manpower approach to educational planning. A fundamental difficulty, for instance, is that this approach does not explicitly consider the interdependence of economic and educational policies or attempt to design such policies simultaneously. Rather it treats them in a unilateral, sequential fashion. The principal reasons for requiring the simultaneous determination of such policies were explored in Chirikos (1967) and Paukert (1964). In varying degrees of detail, both showed that educational policy based on sequential deductions from a given development plan implies that education is passively required to fulfill plan targets but not actively responsible for the optimal terminal conditions of the planning period. Furthermore, such sequential analysis typically is made without any attention to the feasibility or opportunity costs of supplying educational services over the course of the plan. Two simple solutions to these difficulties were explored by Hollister (1966) at the point of his evaluation of the use of sensitivity analysis, i.e., measuring the response of a system to parametric adjustments in system relationships and, a related concept, "sources of change analysis."

Generally speaking, one of the first attempts to deal with this kind of problem was the highly aggregate Tinbergen-Bos-Correa model. This construct was originally set forth in Correa and Tinbergen (1962) and more extensively in OECD (1965a). Built on simple input-output principles, the basic model is a set of six linear difference equations which relate the operation of the educational system to various types of educated manpower required to produce a given level of gross output. The aggregate nature of the model, in addition to the fact that it eliminates the intermediate step of estimating occupational needs by relating fixed proportions of educated manpower directly to output, is an obvious limitation in its usefulness to educational planners. Yet, because the model is capable of showing simultaneously the impact of changes in gross output on the structure of the educational system, it may be more useful for assessing policy options than it appears.

More important were the attempts to provide simultaneous solutions through the use of linear programing techniques. For instance, Chance (1966) showed conceptually how a general model employing occupation-output coefficients on the demand side and a Markov chain on the education or supply side can be manipulated to produce consistent economic and education policies. Adelman (1966) used data from Argentina in a methodological study of a linear programing model which optimizes educational investment and gross output simultaneously. Her model was composed of a relatively complicated set of exogenous and endogenous linear constraints which relate student flows and educational inputs to an aggregate macroeconomic model through an intermediate set of occupation-output coefficients. Adelman then used several variants of an objective function which maximizes gross output (subject to the linear constraints) to test alternative educational and economic development strategies. Bowles (1967) also used dynamic linear programing techniques for the same purpose, although his use of an objective function which maximizes the present value of a discounted stream of future earnings bears a stronger relationship to the rate-of-return studies discussed below than to the use of manpower models for educational planning. The work of both Bowles and Adelman seems to have been fruitful, and further research along these lines is required to assess the problems and potential of such techniques for planning purposes.

Response to Manpower Models in Educational Planning

In addition to research designed to improve manpower-based educational planning models, there was also a significant response from a number of specialists who believed that manpower criteria are inappropriate guides to educational investment policies and argued that other types of criteria should be used for this purpose. It should be noted that much of this response stemmed from a failure of critics and proponents alike to distinguish between human resource planning and educational planning. These terms are frequently used interchangeably, and it has been inferred in many parts of the literature that they are one and the same activity. Parnes (1965) argued, however, that there are substantial differences between the two. More particularly, he showed that educational planning is at the same time broader and narrower than human resource planning. It is broader in the sense that it is concerned with all of the goals of education rather than simply the vocational implications which are of such interest to manpower or human resource planners; it is narrower in the sense that even though it is oriented toward training manpower, educational planning has nothing to do with other factors affecting the productivity of the labor force such as public health programs and labor market organization. Thus, while there is a substantial area of overlap between these two activities, they are not identical in nature and scope.

The importance of this distinction in the present context is that if a nation is interested in planning improvements in the quality of its labor force, the almost exclusive use of manpower criteria for designing educational policy and even other programs such as health seems to be unavoidable. Those who argue against the use of such criteria in this type of situation are not really at odds with a planning technique, but rather with a set of policy objectives. On the other hand, if a nation is primarily interested in planning its educational system (as were the MRP and similar countries) it may want to use manpower criteria to clarify the relationship between development goals and educational expansion, but it will also have to introduce other criteria into its planning operation to account for the noneconomic aims of education. Now the fact is that the MRP and similar projects did introduce such additional criteria into the formulation of their plans. Both proponents and critics have obscured this fact, however, by referring to these projects as human resource planning exercises, and thus inferring that manpower was used as a target variable rather than as a convenient method for relating educational investment policy to the requirements of economic development. Thus, if these terms could be carefully distinguished in the future, much of the philosophical reaction to the use of manpower criteria in educational planning might be eliminated.

Notwithstanding this problem, however, the use of manpower criteria was attacked by a number of specialists on technical grounds. Foremost in this group were Anderson and Bowman (1964). They objected, for instance, to the implicit assumption in manpower planning exercises that there are zero or near-zero elasticities of demand for labor, i.e., that the amount of different kinds of labor required is invariant with respect to the price of labor. This is, of course, a questionable assumption over long periods of time, although there is little empirical evidence to suggest that technological change is influenced to any great extent by marginal adjustments in factor prices. Furthermore, as Miner (1967) pointed out, assumptions of fixed coefficients, i.e., zero elasticities, must be expected in almost any planning operation where interindustry methods are used to project sectoral targets.

More significant perhaps was the charge made, not only by Anderson and Bowman but also Cash (1965), Smyth and Bennett (1967) and others, that manpower models are inappropriate guides to educational policy because they ignore the costs of such policy relative to the benefits stemming from implementing it. This is the primary reason that these specialists promote the use of rate-of-return or cost-benefit analysis in educational planning. In the sense that the MRP-type planning exercises treated costs in a relatively cavalier fashion, this is a legitimate point. That is, the method typically used in manpower-education planning was to assess the costs of an educational plan with respect to the availability of financial resources, thereby ascertaining whether the plan could be made operational. Presumably, the benefits from such policy stem from meeting the production and consumption targets specified in the economic development plan, although no comparison is actually made between the benefits and the costs of the educational policy. The problem is that, without such comparisons, any educational policy can be seen to be consistent with development objectives, irrespective of its real cost to society.

On the other hand, the use of cost-benefit analysis, as that is presently understood in the literature, requires making a number of rather heroic assumptions that may also tend to mislead educational policy, especially in the measurement of benefits. The reason is that benefits are typically measured as the present value of a discounted future stream of net income accruing to graduates of different levels or branches of the system (or as a rate of discount which equalizes income streams and costs). As Bowen (1964) pointed out, however, for such benefits to measure the contribution of education to economic development, one must assume that wages and salaries adequately measure individual contributions to the social product, i.e., that wages are tolerably close to marginal productivities. The rigidities which characterize labor markets, particularly in the underdeveloped countries, make such an assumption highly questionable.

Moreover, even if this assumption is essentially correct in the current period, there is no reason to suppose that it will hold true in the face of rapid structural and technological shifts in the economy over time. Yet, this possibility is inconsistent with the manner in which net earning streams are estimated, viz., through projections of age-earning profiles. In response, Anderson and Bowman (1964) argued that such disparities (as well as the problem of obtaining needed data) could be eliminated by attaching shadow prices to labor inputs. The only operational basis available for estimating such shadow prices, however, is to use forecasts of manpower needs over the course of the planning period—exactly the approach that Anderson and Bowman find so objectionable.

Conceptual problems aside, it is perhaps still too early to evaluate the use of cost-benefit analysis because of the small number of planning operations that have actually used the approach. More work in the less developed regions of the type carried out by Smyth and Bennett (1967) with Ugandan data and Bowles (1967) for Northern Nigeria is required to assess the operational validity of these techniques. Further methodological work is also required to see whether there are alternative methods for measuring the economic benefits of education and, hence, to see whether the problems inherent in almost all of the models discussed above can be eliminated or reduced.

Models of the Educational System

While considerable attention has concentrated on the procedures for setting "output" targets for an educational system, comparatively little research has been carried out to refine the techniques for relating educational inputs, including student flows, to such target figures. Indeed, since this is the stage of the planning process where general research related to educational policy, particularly that part which is related to qualitative improvements in the system, must be incorporated into the plan, the fact that this facet of the field has not attracted the interest of more specialists can only be lamented. Hopefully, the generation of new and more standardized data on educational systems—perhaps following the guidelines established in an excellent handbook prepared by the OECD (1967c)—will stimulate additional interest in this area.

As the language of the preceding discussion suggests, the educational system has been viewed by planners as an interdependent process which transforms a given number of student inputs into student outputs. The primary purpose of educational models is to specify the main structural features of the system and to trace student flows through the transformation process as they proceed from branch to branch and level to level of the system. Armitage and Smith (1967), Davis (1967), Moser and Redfern (1965), OECD (1967b), and Stone (1965, 1966) showed in varying degrees of detail that the basic form of such models is a simple input-output matrix which measures changes in the stock of students between specific points in time in each educational process, i.e., level and track of the system. A matrix of the transitional probabilities of passing through the system can then be obtained by measuring the exact changes in these stocks during specific periods of time. The inverted matrix of the transitional proportions multiplied to a set of exogenously determined output targets will then yield an estimate of the current level and composition of student enrollments throughout the system needed to meet these future targets.

While such flow matrices can tell the educational planner a great deal about the internal operation of the system, the principal problem with their use is that the matrix of transitional probabilities cannot be assumed to remain constant over time. In fact, the real planning problem is to estimate the extent to which these coefficients may or can be changed over the course of the plan. Aside from the possibilities of using trend analysis, very little attention has been given to the methods that may be used for this purpose. What is significant, of course, is that changes in these coefficients are presumably a function of changes in the quantity and quality of educational inputs such as teachers, curricula, instructional materials, and classrooms. Although teacher requirements are frequently augmented by adjusting the teacher-pupil ratio downward so as to introduce qualitative improvements in the system, models of the educational system have not yet considered the likely impact of such changes on the rate and direction of student flow characteristics. In the underdeveloped countries, however, this may be of critical importance, particularly in terms of the costs of educational policy, because of the exceedingly high rates of attrition and student dropouts. While it is difficult to criticize the literature and recent planning operations too much for having omitted such questions because of their obvious complexity, these questions must be considered in models of the system if they are to aid educational decision making.

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CHAPTER VI

Research on Content, Methods, and Techniques in Education for Development

SETH SPAULDING

Much of the research in international development education has been concerned with the impact of the educational enterprise as a whole on the processes of economic and social development. Yet there has been much less research on the educational process itself in emerging countries, as well as less research on the content, methods, and techniques of education, and on how innovations in the educational structure might affect the educational product. In essence, we need much more research on the inputs into the educational system so that we may know more about what might happen under optimum conditions to achieve specific educational goals.

Beeby (1966), for instance, proposed a hypothesis which suggests that there are four stages in the growth of primary education in emerging countries. These occur as teachers generally advance from a "dame school" stage, with no professional training and no professional education beyond base literacy, through formalistic and transitional stages to a highest stage of "meaning," when teachers have received both thorough grounding in their professions and a broad general education. He suggested the need for research and experimentation in determining which innovations appropriately can be introduced into the educational system to improve both quantity and quality, given restraints such as the limited abilities of undertrained and undereducated teachers at the lower stages of educational development.

Perkins (1967), in summarizing the results of the International Conference on the World Crisis in Education called by President Johnson in Williamsburg, Virginia, October 1967, suggested that there was agreement that "the precondition for obtaining any kind of innovation in an educational system is improved management at every level." He continued to suggest that high productivity is also dependent on the skill of the teacher, and on the capacity of the teacher for using new technology such as programed instruction, team teaching, film, radio, and television, which will be increasingly the tools of the trade. Finally, Perkins suggested that content and technique are closely related matters, with each affecting the other. Maheu, UNESCO's Secretary-General, was quoted as suggesting at the Conference that 2 percent of the educational budget in countries throughout the world should be applied to the research process.

The Status of Educational Research Abroad

The increasing international interest in educational research is documented in a survey undertaken by the International Bureau of Education (1966) prepared for the twenty-ninth session of the International Conference on Public Education. Eighty-four countries responded to the Bureau's questionnaire, of which over 40 indicated that there are separate educational research units within the Ministry of Education, most having been set up only recently. Another 25 countries suggested that research units exist, but as a part of other centers or offices in the Ministry. At least 20 countries have "university institutes which devote the whole of their time to educational research," and there are also numerous private bodies so engaged. Finally, "the need for systematic coordination in the field of educational research is recognized in several replies," but there are official units to affect such coordination in only 15 countries; and 10 others have plans to establish such a unit. At least 40 countries gave practical examples of the results of educational research in influencing teaching content, materials, techniques, and educational structure.

The results of the above survey provide a virtual mine of information for the educational researcher who is interested in cross-cultural collaboration. Forty-seven of the countries responding now receive multilateral or bilateral assistance in their educational research activity, and 16 countries do not but would like to receive assistance. Suggested by survey responses was international collaboration in research on educational methods and syllabi, new techniques, literacy and education for adults, educational planning, school administration and organization, teacher and research training, and many other areas.

A summary of research in secondary education in Latin America by Watson (1967b) points up the need for more research on educational innovations which go beyond descriptive studies currently prevalent. A similar call for microstudies at the higher education level in Latin America was expressed by Arnove (1967) in a survey of research to date. He indicated that there is yet no cumulative body of research on teaching, curriculum, administration, and student services in higher education, although there is a surfeit of descriptive-comparative studies.

Unhappily, much of the published work of educational research abroad, and especially in developing countries, is generally unavailable in the United States. Several of the ERIC Clearinghouses have announced intentions to include foreign research in their activities, but they are generally not budgeted or staffed to make more than a token effort. The Office of Education has not as yet responded to the obvious need for a well supported Clearinghouse dealing specifically with international and development education. Several of the university centers mentioned in the first chapter of this issue, however, are collecting and maintaining research collections; and it is hoped that further funding for these efforts will be available in the future.

Space does not permit reporting on the many dozens of significant studies mentioned by informants throughout the world who responded to the questionnaire distributed as we began this issue of the REVIEW. We will attempt only to summarize broad trends in research on curriculum improvement; technology in education; and literacy, reading, and books in development. These are three areas which figure high on the list of subjects most often mentioned in developing countries as needing further research and as being of immediate, practical value.

Additional References: Centro Brasileiro de Pesquisas Educacionais (1967); Klingelhofer (1967); Paik (1967); Pan American Union (1966); Sanders (1966); U.S. Department of State (1967); Watson (1964).

Curriculum Improvement

Curriculum Development

The Organization for Economic Cooperation and Development (OECD, 1966) has issued an international task group report on curriculum improvement and educational development which suggests that new approaches are urgently needed to curriculum construction and change. The report suggested methods of curriculum change and reviewed past experience of 21 member countries in curriculum development, problems of curriculum adjustment, the relationship between curriculum and instruction, and the coordination of curriculum with school organization. The notion that curriculum building is intimately linked with teaching methods, school organization and administration, preparation of teachers, school-building design, teaching materials, and so on, was stressed. Continuous research was called for, and the activities of a variety of educational research institutions in OECD countries were briefly described, including the Foundation for Educational Research in the Netherlands, the State Board for Experiments in Schools in Sweden, the National Pedagogical Institute in Greece, the Educational Research and Planning Office in Portugal, and the Institut für Bildungsforschung in der Max-Planck-Gesellschaft in Germany.

OECD has undertaken a number of activities and studies to assist member countries in curriculum revision; and the results of much of this work in math, chemistry, and physics are reported by OECD (1961a, b; 1963a, b; 1964a, b; 1966). UNESCO (1966b; 1967a, b, d) has undertaken similar curriculum work in the sciences in a variety of countries, beginning with a Pilot Project in Physics Teaching in Latin America based in São Paulo in 1963-64, a Pilot Project for Chemistry Teaching in Asia based in Bangkok from 1965-68, a Pilot Project in Biology

Teaching for Africa in final stages of planning during 1967, and a Pilot Project in Mathematics Teaching for the Arab States in planning for 1969. These pilot projects are designed to raise the quality of science teaching by collaborative international efforts to bring subject matter up-to-date through the introduction of inquiry methods into student laboratory work, through the encouragement of teachers to employ newer techniques of instruction, and through efforts to package new instructional approaches in the form of new kinds of teaching materials adapted to the school environment of developing countries. UNESCO (1967c) also proposed National Science Teaching Centers which will continue this work on a long-term basis.

UNESCO's program in education is wide-ranging, and there is increasing emphasis on research components of its development project. Its Draft Programme and Budget for 1967-68 (1966a), adopted almost verbatim by the Executive Board and General Conference, stressed the introduction of new methods and techniques in curriculum work and teacher education throughout the world. Hopefully, this emphasis on curricular innovation will stimulate research about the effects of differing curriculum structures on achievement.

Curriculum, Culture, and Language

One of the problems often noted is that children's learning styles are related to their cultural and social background and to the experiences which are part of everyday life. This becomes particularly critical in curriculum revision schemes where there is an attempt to teach the structure of knowledge, but where the children enter the school with notions of time, space, motion, and conceptual interrelationships different from those of the curriculum builders. Some of these differences in learning style among Liberian children and implications for curriculum and teaching methods were explored by Gay and Cole (1967) in a field study using approaches borrowed from both anthropology and psychology. Schwarz (1961) demonstrated that Nigerians do not do well on aptitude tests which require the performance of Western skills normally associated with aptitude. This, however, showed only that Nigerians had not acquired these skills through nonschool experiences normal to Western children and adults and had little to do with predicting the *capacity* of the Nigerian to acquire them. Schwarz (1963) has further suggested ways of adapting test procedures by relying on dynamic techniques that take into account the behaviors which are important in different cultural settings.

Such cultural differences should affect language policy in emerging nations which in turn affects curriculum building. There is increasing concern among emerging nations that a common language be adopted nationally or regionally to encourage national unity and to facilitate education and manpower development. However, the more common languages, used to communicate technological and cultural concepts beyond the experience of the people who speak a local language, may have no meaning until a conceptual base has been established, perhaps through several years of education in a local language. Modiano (1966) presented compelling evidence to show that Mexican Highland Indian children who learn to read and write first in their own tongue do better in Spanish reading comprehension in later years than those who learn to read Spanish without literacy in their own tongue. She hypothesized that this may be because children must begin to learn how to place meaning into a symbol that is already familiar to them aurally before learning a new symbol. She does not discuss the possible implication that the new language expresses concepts that are more meaningful once the children are further along in their educational careers, although the extensive bibliography in her study included material that might so suggest.

McCreary (1966) reported on a three-year study of Maori elementary children in an isolated community in New Zealand. He found that these children enter school well below the New Zealand norm in mathematical and reading skills, but they improve in mathematical skills very rapidly as they progress grade by grade. Their reading skills do not improve as rapidly, however. The Maori children use English as a second language and come to recognize words, but they cannot always understand the words in varied context. The author pointed out that home and community do little to supplement learning experiences for these children, and he implied that the school should rethink its approach in adapting curriculum and methods to their special needs.

A related study of the Maori children by Lovegrove (1966) showed that Maori and European children from almost comparable home backgrounds performed similarly on tests of scholastic achievement, though Maori children from less affluent home backgrounds generally perform less well. Also, Maori children often adopt negative or indifferent attitudes and consider themselves inferior to European children; and patronizing attitudes are adopted by Europeans, this perhaps leading to negative influences on achievement. Learning styles of Maori children appear to place relatively less reliance on intellectual abilities and the more intellectual adjuncts such as listening and speed skills. The author called for more emphasis on helping teachers understand the cultural influences of learning behavior and ways in which the inherent abilities of such rural children can be tapped.

The Educational Testing Service is undertaking a variety of studies which will be of further help in identifying learning styles and behaviors that are affected by cultural differences, and publishes an *International Newsletter* which summarizes its own studies and those of others. American Institutes for Research similarly reports on international research of its own and of others in the *AIR Newsletter*.

Additional References: Griffin (1967); Werdelin (1961).

Input-Output Studies

The massive study reported by Husén (1967) assessed mathematical ability and attitude of some 133,000 students in more than 5,000 schools in nine Western European countries, Japan, Israel, and the United States. The major significance of the study was its attempt to relate input into the educational system (organization and structure, curriculum, methods, per pupil expenditure, class size, socioeconomic status, etc.) to output as expressed in achievement tests. Over 5,000 school administrators, 13,000 teachers, and a variety of other informants provided information on the nature of the school and what goes on in it. The problem in assessing such data, of course, is that it is difficult to isolate with any degree of reliability or validity those causal factors that affect educational achievement.

A study of somewhat comparable intent by Coleman and others (1966) related school characteristics in the United States to general academic achievement of majority and minority groups. Included was a survey of over 645,000 students and 60,000 teachers in 4,000 public schools. Quality of the school, its curriculum, and its teachers appeared to relate more directly to achievement of minority group children than to achievement of children of majority groups, further suggesting the need for schools to adjust their programs to cultural differences children may bring with them. These, and other such studies, provide both methodologies and suggested hypotheses that might have relevance for developing countries.

Technology in Education

Mass Communication in Development

There is increasing evidence that the technology of mass communication is intimately linked with development. Schramm (1964) presented data which show a high correlation between the communications infrastructure of a country and its level of economic development. He summarized a variety of studies, many unpublished, which show that the mass media can and do change people in many ways. As new information reaches people their social, political, and economic aspirations change, the basic personality structure of people can be affected, and the achievement of goals can be influenced.

Doob (1961), in a study done in Africa, emphasized the need to understand more about how to frame educational and informational messages via the mass media so that they are understandable by people with primitive educational backgrounds. He also suggested, on the basis of his studies, that there are management and infrastructure problems in creating a media environment in developing countries.

Lerner (1958) claimed reciprocal relationship between the development of the mass media and modernization, based on extensive interviews and case study materials in the Middle East. He also suggested that in modernization, people must develop a mobile personality. The mass media are essential in the spreading of ideas and attitudes of social mobility and change necessary for modernization.

There is some provocative evidence that mass media can be influential in stimulating what McClelland (1961) called need achievement. McClelland indicated, on the basis of numerous studies, that there is a high percentage of people who are ambitious, upwardly mobile, innovative, and other-directed in societies which are rapidly developing and modernizing. There is further indication that this need achievement, or achievement mystique, is acquired early in childhood. There appears to be some historical correlation between periods of notable national growth and achievement models in popular literature and children's stories.

Additional References: Deutschmann (1963); Lerner and Schramm (1967).

Instructional Uses of the New Technologies

The International Institute for Educational Planning, established in Paris in 1963, has placed the need to learn more about the use of the new technologies in education high in its priority list for research. A series of case studies issued by the Institute (1967) and a summary document by Schramm and others (1967) discussed the implications of the use of television, programed instruction, radio, correspondence study, and films and audiovisual aids as they are used in upgrading instruction in teaching teachers, in extending the school, in literacy and fundamental education, and in adult education and community development. Although many of the 23 cases are remarkable examples of how a new strategy of education can be effective in resolving specifically defined educational problems, it is obvious that "in relatively few places have the media been used as full partners in education, been woven into the system, and used seriously and fully to attack urgent problems." One limitation of these reports is that they are point-in-time studies, using readily available data which were often incomplete. Much more longitudinal interdisciplinary research is needed to assess the institution-building problems involved in such innovations and to study the economic and educational implications over time. One such institution-building study has been undertaken by Porter (1967), who examined the development of the College of Education in Bangkok, Thailand, over an eight-year period.

Duke (1963) reported early efforts to introduce new educational media in 10 countries of the Far East. He gave a brief report on education in the Far East, summarized innovative uses of media technology in 10 countries, and compiled research abstracts of studies on the uses of individual media from still pictures to programed instruction and television. A directory of research institutions was included. As would be expected, Japan has done a great deal of experimentation with new techniques and methods, although there appears to be beginning activity elsewhere in Asia. Many studies simply showed that exposure to new media indeed induces some change in the student, even as exposure to a teacher induces some form of change. However, several studies were reported which demonstrate differential effects of structuring and pacing content and of utilizing media in a total instructional context. Harrison (1962) issued a similar survey of European Research in Audio-Visual Aids, covering 1945-61, with abstracts limited to research reports directly related to learning; and Ely (1965) described educational media research efforts in 19 Latin American countries.

Additional References: Centre for Educational Television Overseas (1967); Comstock and Maccoby (1966); Council for Cultural Cooperation (1966); Department of Extra Mural Studies (1965); Fougeyrollas (1967); Hancock (1967); Holmes (1963); Luft (1966); Mialaret (1966); Myren (1965); National Board of Education, Research Planning Bureau (1966); Nippon Hoso Kyokai (Japan Broadcasting Corporation) (1965); Rhoads, Piper, and Brodbeck (1963); Verner and Millerd (1966).

Programed Instruction

Programed instruction as a concept has captured the imagination of educational researchers and administrators in countries throughout the world. In a recent survey undertaken by Spaulding (1967a) and the University of Pittsburgh for UNESCO, research studies and projects underway in several dozen countries were listed. Many of these studies simply show that teaching materials can be made better if they are constructed with some predetermined, learning-theory based pattern in mind, and if they are empirically tested and revised before they are issued in final form. Much more research is needed, however, on the effect of altering strategies of instruction in developing countries where teachers are often undertrained and whose students are often unfamiliar with methods and techniques other than the lecture method demanding rote memory.

As would be expected, the more highly developed countries are doing more research and development in programed instruction than the emerging nations. Schramm (1963) edited reports on the status of programed instruction in England, Japan, France, and the Soviet Union; and the Pädagogische Arbeitsstelle in Berlin (1964) published working papers of a 1963 international conference on programed instruction which included several status reports on research. The Commission de la République Française pour l'Education, la Science, et la Culture de France (1964) has issued a conference document on the theory and practice of programed instruction. A recent article by Kishi and Numano (1967) of the

Center for the Science of Learning, Keio University, Tokyo, summarized Japanese activity in programed instruction from 1960-66, and Keeves (1964) issued a review of programed instruction activities under the auspices of the Australian Council for Educational Research.

Programed instruction would appear to have unique advantages in improving the quality and extending opportunity of education in developing countries. UNESCO has disseminated information on programed instruction, and Komoski and Green (1964) have reported on two UNESCO training workshops on programed instruction held in West Africa and in the Arab States. However, little research has yet been done on the effectiveness of a programed-instruction strategy in a country with limited economic and educational resources. One possible exception is the work done by the Programed Learning Centre of the Faculty of Education, University College of Rhodesia. This Centre devotes its efforts to research and service in the Central African context, and much of its significant research efforts were summarized by Hawkridge (1967). The Centre maintains a Research Division, a Reference Division, and a Report Division. Its research is directed largely toward the development and validation of program sequences.

Additional References: Adult Education Association of East and Central Africa (1966); Dewan and Kulkarni (1967); deWet (1964).

Literacy, Reading, and Books

The Effect of Literacy Programs

UNESCO has inaugurated a world campaign against illiteracy, and pilot projects have been undertaken in a number of countries heavily funded under the United Nations Special Fund. A research component is presumably built into each of these projects, described in a publication by the U.S. National Commission for UNESCO (1967); and it is expected that these projects will yield data on literacy teaching methods and their effectiveness, the effect of literacy on people and communities, the economics of literacy campaigns, and the like. Curle (1964) and Spaulding (1966) outlined the background of this world campaign and suggested research dimensions which must be explored. Blaug (1966) discussed the possible economic payoff of literacy and suggested that investment in selective but intensive literacy programs may provide greater economic benefit in the short-run than investment in traditional formal school education.

Blaug (1967) has also issued a "trend report" on current research on literacy and illiteracy with a useful annotated bibliography attached. He suggested that there has been significant research to date on reading and methods of teaching reading and on materials useful for adults who are beginning to read but that we have little usable research on the organization and administration of literacy programs, on the short- and long-term effects of literacy on the economy, or on the attitudes and behavior of people. Exceptions include the work of Doob (1961), Rogers and Herzog (1966), and Wright, Rich, and Allen (1967). These studies of illiterate and newly literate adults in Nigeria, Colombia, and Guatemala generally concluded that the literate child or adult has a greater awareness of the world around him, is often more receptive to change, has greater exposure to the mass media than the illiterate, is economically more productive, and generally understands the value of literacy more than does his illiterate counterpart. The failings of these studies are obvious: they are point-in-time efforts in communities that may or may not be representative of others, and there is little way of knowing what other personal characteristics or social and cultural influences may have been causal in determining the differences. Indeed, a longitudinal study of people in one village who have the opportunity to become literate as compared to people in a comparable village who do not have the opportunity may not be feasible. Prevalent thinking is that literacy must be linked to other development efforts to be successful, and it may be impossible to separate the effects of literacy from other change influences.

Other suggestive studies on literacy in India were reported in an annotated bibliography prepared for UNESCO by the Indian Adult Education Association (1967). Thirty-one studies were annotated and grouped under the following headings: Selection of Groups; Motivation and Participation; Media, Methods, and Material; Teachers and Volunteers; Organization, Administration, and Finance; Evaluation Reports; and Seminar Reports. More than 12 agencies in Media were reported to be undertaking research on literacy; and many of the studies are beginning to shed new light on why illiterate villagers do or do not attend literacy classes, what methods and materials work best, how much literacy training costs, the reasons for desertion of literacy classes, and other related problems. The report stated that no relevant research was found in other Asian countries.

Additional References: du Sautoy (1966); Fourré (1964); Groombridge (1966); International Bureau of Education and UNESCO (1964); Knox (1967); Mezirow and Epley (1965); National Society for the Study of Education (1959); World Confederation of Organizations of the Teaching Profession (1967).

Literacy Teaching

Needed research in literacy teaching was summarized by Hayes (1964) for the Center for Applied Linguistics. Based on an interdisciplinary conference convened for the Agency for International Development, the report called for studies based on descriptive linguistics, studies in experimental psychology, socioeconomic studies, and studies of strategies and techniques of organizing and administering literacy programs. The Center for Applied Linguistics followed up this conference report by establishing a Clearinghouse on Literacy which is accumulating documentation for dissemination to interested researchers.

Gudschinsky (1962) summarized her linguistically oriented research on literacy teaching in a practical and useful handbook which suggests the need for more such studies, and Laubach and Laubach (1960) summarized their early experiences throughout the world. These and other studies on literacy methods suggest that the success of a literacy scheme depends in part on effectiveness of the teaching method. There is little agreement as to the method most appropriate to each country and each language problem.

Additional References: Gray (1956); Halvorson (1967).

Reading Materials

There has been much concern that reading materials, matching the interests and reading abilities of "new literates," be made available in large quantity in developing countries to avert regression to illiteracy on the part of school dropouts and adult new literates. Research in several countries by Spaulding, East, and others was reported by Richards (1959). These studies generally indicated that authors profit from carefully designed field testing and revision of materials and that newly literate adults will read materials if available and if written at their level of reading ability. This report also listed a variety of related research problems that need further investigation, many of which still remain to be examined.

Spaulding (1958) suggested a research and development model for the preparation of reading materials which could be understood by, and which would be of interest to, newly literate adults. He also developed a Spanish Readability Formula (1956a) for judging the reading difficulty of Spanish prose and did early studies on the communication potential of pictorial illustration among adults of limited reading ability in Latin America (1956b). The latter report showed that drawings and captions can help in reading comprehension if the illustrations are realistic, if they do not contain an excess of detail, if they relate to the text they accompany, if they relate to the experience of the viewer, and if they are pretested before use.

The Agency for International Development has recently become concerned that the book creation, production, distribution, and utilization process is poorly developed in low-income countries. A series of studies of books in education in national development in a number of countries have been undertaken by several universities and consulting organizations. Only those done for Peru by Spaulding (1967b) and for Chile by Watson (1967a) have been published for general distribution.

These studies generally suggest that there is little in the way of planning for national book publishing and production in most developing countries, nor much of an infrastructure for the creation of effective curriculum and textbook materials for education. However, there are book activities in all countries studied; and the reports suggest that a very favorable educational cost-benefit ratio might accrue from much greater attention to the role of books in education and from the provision of instructional materials which take into account the limited training of many teachers as well as the cultural environment of the students.

Additional References: Hiebert (1965); Jackson (1967); Klitgaard (1966).

Conclusion

Emerging countries are placing great emphasis on education in their development plans. With scarce resources available, they are increasingly concerned that education should be as productive as possible. Accordingly, educational research efforts tend to be directed toward finding practical answers to pressing problems of how to teach more students more effectively.

Many studies, however, lack rigor; and coverage of problem areas is not balanced. Teacher education, for instance, is rarely the subject of research in developing countries, except for demographic studies reported elsewhere in this issue or descriptive and historical studies such as those reported in Bereday and Lauwerys (1963).

On the other hand, there is much to be learned as emerging nations take different approaches to resolving their massive educational problems. If these efforts can be documented and researched fully, the more highly developed countries will surely learn more about the educational process, about ways of dealing with individual differences of children, about learning styles, and about ways of organizing education to meet the challenges of development.

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CHAPTER VII

International Development Through Educational Exchange

MARGARET L. CORMACK

The evolution of educational exchange since 1945 reveals both tough and tender coin with a spectrum of aims and practices that include foreign policies, curriculum with a global frame of reference, and idealized human relations. A detailed discussion of this evolution and the corresponding evaluation of research may be found in Cormack (1962).

The United States, because of its postwar leadership role and facilitating affluence, has sustained preeminence as host in educational exchanges, as regards both the quality of its educational resources and the numbers of students and scholars invited or attracted to its institutions of higher learning. It has produced, concurrently, the largest volume of program evaluation, partly in order to sanction funds but partly because ours is a self-conscious culture. Much of this has been of minimal value except as program ritual.

A major difficulty in the field of educational exchange and hence in this evaluation is the general absence of rigor in the definition or conduct of research. The unscientific approach can be explained in part by the magnitude of the problem and the diffuseness of exchange aims and policies. A variety of individuals, propelled by a variety of personal and national motivations, representing a variety of cultures and subcultures, have sojourned in a variety of institutions in a variety of fields for various lengths of time in various periods. Further, the emotional effects continue to smother objectivity. Even the term *educational exchange* connotes a mutuality norm contrary to reality. The term has become standard, however, and pertains to an international phenomenon that is a collection of individuals and groups moving in both time and space. It is obscured in a scientific sense by strong personal affects and national policies; hence it does not lend itself easily to serious intellectual inquiry. Hundreds of governmental and institutional evaluations of educational exchange were serious enough but were far from objective and were usually "loaded" toward "favorable image" responses. Many graduate theses, even when rigorous, have been largely confined to data obtained from available respondents, have studied participants during their sojourn only, and have had no control groups.

Most studies have been grossly cosmic or narrowly microcosmic. The danger lies not in emphasis on whole or parts, for both approaches are needed, but in the holistic interpretation generally accorded on the basis of limited data. In fact, the misuse of data has caused the most competent researchers in the field today to be reluctant to undertake cross-cultural research, for they realize the problems involved in defining the research universe, selecting and measuring the variables, and utilizing control groups. The complexity of the field must be emphasized, but interested researchers today should at least be grateful that the primitive and emotionally charged phase has passed and that definite research is finally feasible. One should start with clear questions in relation to which there are meaningful variables that lend themselves to measurement. It is not possible to research "educational exchange as a promoter of peace," but it should be possible to ascertain specific changes of attitude and behavior that relate to modes of conflict and cooperation. It is probably not possible to determine the function of language in overseas study, but one can correlate English language competence and academic success in relation, of course, to the specific conditions of time, place, and personnel.

This discussion of research will be confined largely to studies of foreign students in the United States (or after their return), for this is the largest body of critical evaluation. Very few studies have been made of Americans studying abroad—a fruitful area of needed inquiry. Perhaps the most seriously neglected educational exchange population is that of professors. Cleveland, Mangone, and Adams (1960) broadly and minimally discussed American professors, but the only significant research was completed by Goodwin (1964) on American professors in Asia. From the development point of view, research on lecturers, consultants, and research scholars is essential, although data on the personnel involved should be only one aspect of the inquiry.

Sources of Research Information

The organizations continuously interested in research on educational exchange are the Institute of International Education (IIE), the National Association for Foreign Student Affairs (NAFSA), the American Association of Collegiate Registrars and Admissions Officers (AACRAO), and some special area associations such as the African-American Institute, Friends of the Middle East, and the Bureau of Educational and Cultural Affairs in the Department of State. The most important regular issues of bibliography or other data are IIE's annual *Open Doors* and *Research in Progress*, NAFSA's *Newsletter*, and Department of State External Research Staff bibliographies on cross-cultural education and research in progress.

Recent and significant evaluations and summaries of research on educational exchange include the comprehensive and useful Walton (1967) analysis. Long connected with IIE's Committee on Educational Interchange Policy, Walton summarized inquiries and conclusions on favorable attitudes toward the United States, the development of youth leadership, what students learn and how they use it, the migration of foreign students, the cross-cultural adjustments of foreign students, orientation and academic performance, and the impact of foreign students on the United States, with bibliographies following the major portions of the analysis.

Spencer continuously issues mimeographed research reports, available on request. They are rigorous in assumptions and interpretations and include extensive bibliographies. The most recent and valuable (1967) is on the "Academic Performance of Foreign Students in American Colleges and Universities."

Behavioral Research

As an increasing number of foreign students reached American campuses, foreign student advisers had to be appointed. Their most immediate concern was the "culture shock" and adjustment problems experienced by most students, in addition to the inevitable legal and financial difficulties. The cross-cultural problems proved complex and are still not sufficiently recognized as variations on the theme of human growth and development. Further, as the advisers soon discovered and was documented in the Kiell (1951) study on Indian students, a favorable image of the United States is by no means a certainty or even a high probability. In fact, most students experience an attitudinal U-curve in which their disenchantment with the host country is often at its lowest point at the end of their first (and often only) sojourn year. An original interest in "adjustment" gradually shifted to "acculturation" as those in contact with foreign students became more sophisticated, but both concepts have generally been used too loosely, especially in the early research, to be meaningful.

Not until some behavioral scientists became interested in cross-national behavior from culture and personality points of view was there any scientific consideration of the effect of foreign training on students. Useem and Useem (1955), for instance, introduced the important element of social roles, and Coelho (1958) discovered that the U-curve applies to attitude toward home culture as well as host. This phenomenon is a useful first step in the objectification of all cultures. The most important area of needed research on the individuals involved in exchange is in this field, with inquiries inductive and devoid of program aims, naïve assumptions, or idealistic norms, although the data and conclusions would inevitably facilitate more appropriate selection and guidance procedures.

Priority research areas include longitudinal studies, to include extensive background and follow-up, studies on the international migration of talent—the "brain drain"—and studies on institution building from the development point of view.

Educational exchange as a "good thing" has achieved some maturity in 21 years, if only because those involved in its administration realize the complexities of human aspirations and achievements and now want sounder analyses that will lead to more productive programs and a reduction of human and financial waste. The cross-national movement of scholars and the resultant cross-fertilization of knowledge are moving exchange from cult to curriculum, but "development" is not yet a clear goal.

Significant Studies

Benchmark studies that have illuminated the problems of "adjustment" and therefore contributed to a general understanding of the persistence of culture, the probability of culture shock, and predictable adjustment phases are those by Watson and Lippitt (1955) on German trainees; Coelho (1958), Lambert and Bressler (1956), and Useem and Useem (1955) on Indian students; Beals and Humphrey (1957) on Mexicans; Morris and Davidsen (1960), Scott (1956), and Sewell and Davidsen (1961) on Swedish students; and Bennett, Passin, and McKnight (1958) on Japanese students. In each study there was evidence relating to the adjustment of the specific national group, but without any comparison with other nationalities. General hypotheses, therefore, were deduced from comparing their conclusions and from the study by Selltiz and others (1963) that involved a number of nationalities. The latter study is notable not only for methodology and questions about causal relationships as previously mentioned but also for the finding that non-Western students who had traveled were similar to Europeans in their lesser need for orientation programs.

Too much attention was given by most early researchers to "favorable attitudes toward the United States," but through this interest the U-curve—first described by Lysgaard (1955)—appeared as a general pattern. Coelho (1958) made a significant contribution in discovering that the end-of-first-year low point was a "culture crisis," the feeling toward home culture being as negative as that toward host culture. He analyzed the subsequent positive affect as the objectification of culture, predicting that many students remaining abroad more than three years might not return because of this objectification. Pool (1965) made the same point in referring to a "crisis of criticism, not of parochialism." Various studies, most notably those by Gullahorn and Gullahorn (1963), showed that the same U-curve occurs upon reentry to the home culture, the total curve thus being a *W*.

The particular contributions of Beals and Humphrey (1957) were that the Mexican students involved were atypical before studying in the United States and continued to be atypical on their return, and that their "deviance" depended in part on the length of their sojourn, their age, and their degree of involvement with American life. Their comparative data clearly showed that study in the United States proved much more productive for students well trained in their fields than for those less well trained. Bennett, Passin, and McKnight (1958), Sewell and Davidsen (1961), and Watson and Lippitt (1955) also discovered that those who had completed all available training at home before going to the United States, thus there for advanced graduate work, were much more effective leaders and change agents upon their return than those who obtained most of their training in the United States. Factors of personal and professional maturity were undoubtedly important.

Scott (1956) described the broadening experience of study and sojourn for Swedish students defined as already able and active, and found their commitments toward socially constructive activities and world-mindedness enhanced by their U.S. experience. Morris and Davidsen (1960) investigated the influence of perceived national status, finding that this perceived status had greater influence on students' reactions to their American experience than did personal status. Communication skills, in addition, were found to affect interaction patterns. Sewell and Davidsen (1961) in their survey of Scandinavian students found that participation in American life, favorable impressions of the United States, and a successful academic experience were reciprocal influences and that they led to a greater willingness to see foreign traits adopted in the home country.

Lambert and Bressler (1956) found the major determinants of Indian students' experiences in America to lie within their own culture and that the students' ability to understand Americans was contingent on their participation in American life. They suggested that measures to increase understanding of home and host cultures would have more positive value than program manipulations. Useem and Useem (1955) cautioned against naïve "favorable image" assumptions. Their data on Western-educated Indians who had returned home showed that friendships do not alter national interests and that respect for other nationalities often obtains when there is no "liking." The most significant contribution of their study was the consideration of pre- and post-sojourn social relations. The political and socioeconomic conditions at the time—national, local, or familial—radically affected personal motivations. Their data revealed, also, that generalist skills served Indian national utility better than specialist skills did and that a cluster of foreign-educated persons could exert much more change-influence than an individual could.

Watson and Lippitt (1955), who studied returned German trainees at about the same period, found that the entrenched authoritarianism, achievement, and status orientation was not diminished by the U.S. sojourn and that trainees' attitudes changed more in relation to their own country and Europe than to America. Their comparison of age groups showed that the youngest group—which seemed the most enthusiastic about new ideas during their American sojourn—did not retain this "learning" on their return and that the oldest group was consistently resistant to new ideas. The "middle" group was best able to select and adapt intelligently.

The Bennett, Passin, and McKnight (1958) data on returned Japanese students revealed the clear influence of the immediate post-World War II period. There were marked differences in respondents' abilities to discover national identity, e.g., those termed "idealist" (who had lost faith in the Japanese system) were found to deviate more from traditional Japanese norms than did the "adjustors." No correlation was found between the American experience and innovation potential, possibly because innovation was characteristic of the Japanese culture at the time.

The emphasis on "identity" in the above significant study is one that might have led to much more research on personality, so needed in the understanding of culture and cross-cultural behavior. Rettig (1964), for instance, posited a theory of cross-cultural invariance in ethical judgments on data involving American, Korean, and Indian respondents. The total body of research does indicate that nationality may be a factor of little importance.

In addition to the above studies, two special issues of the *Journal of Social Issues* are important. Smith (1956) edited an issue which emphasized adjustment factors and problems. Coelho (1962) edited a more psychologically oriented issue, with emphasis on "identity" and "self-esteem."

Jacqz (1967) prepared the official report of the Conference on the Admission and Guidance of African Students at Howard University which focused on U.S. institutional policies, African manpower needs, and useful resources and practices for African students at U.S. universities.

Scarangello (1967) collected commentaries on the United States and their experience here by visitors from abroad, chiefly graduate students at several universities. Shaffer and Dowling (1967) made a careful study endeavoring to define the problem of measuring the impact of the cultural interaction of American and foreign students on one campus and to ascertain some of its distinguishing characteristics. The methodology is rigorous; the 22 conclusions and 5 recommendations are clearly based on the data.

Additional References: French and Zajonc (1957); Herman and Schild (1961); Myerhoff and Larson (1965); Putman (1961).

Methodologies To Fit the Questions

The various methodologies normally utilized in research could be characterized as variants on the following: (a) census—a population count; (b) opinion poll—the broadest shotgun inquiry, useful only in the determination of opinion (not behavior) on specific issues at that time; (c) sociological—a broad cross-section inquiry utilizing random sampling and short questionnaire and/or interview techniques, and determining patterns of behavior; (d) anthropological—a longitudinal method utilizing the techniques of depth interviews with a relatively small number of respondents, and determining life-styles and cultural patterns over a generation or more of time; (e) psychological or psychoanalytic—the deepest method, employing extended interviews, biological and biographical data, and/or projective techniques designed to probe the unconscious, and illuminating the reasons for behavior.

The census methodology need not concern prospective researchers except in their utilization of population data already collected, in seeing within the data some researchable topics, and in gratitude to organizations undertaking such thankless tasks. The Institute of International Education annually publishes *Open Doors*, the educational exchange population map of the year. IIE (1967), for instance, revealed that 110,999 foreign students and scholars are in U.S. institutions of higher education and that the decreasing proportion of incoming students indicates an increasing number who stay more than three years. Their data, as of last year, included some students now identified as intending to remain in the United States, a subject worthy of research. Countries of origin, institutions in the United States, fields of study, sources of financial support, and other data were similarly supplied.

Another census type of inquiry that is relatively current was directed by the author (Institute of Advanced Projects, 1966). This volume, which includes comparisons with earlier data collected in 1957, is basically a directory and interpretation of the international programs in all American institutions of higher education. As regards foreign students, it provided extended tables that show the numbers, subject matter fields, institutions attended, state involvement, etc., in various correlations. Both this volume and the IIE (1967) volume quantify the increase in students from developing countries, but the Institute of Advanced Projects interpretation emphasizes the lack of institutional policy in the United States. Most research to date has been directed toward the students' motivations, adaptations, and success, but there is a growing need to have institutional ends and means clarified.

Too much so-called research on educational exchange has been the opinion poll type, with the questions in many cases preconditioning the responses, especially with much government-sponsored research in the first decade of the exchange program. This type of inquiry may even have negative value because of false conclusions.

Most of the research has been of the broad sociological type utilizing a questionnaire or interview schedule on the available population. This method had value, but the validity of the data was unfortunately questionable in many cases. Even the most careful researchers have had difficulty with their population of exchange students, either in their neglect to define their universe or in their understandable difficulty in arranging representative sampling. More seriously, the loose use of concepts like adjustment and acculturation detracts from the conclusions. The Selltiz and others (1963) study was a notable and welcome exception, the methodology rigorous in definition and application and the interpretation raising questions on causal relationships.

Some of the best research in the field has been a combination of sociological and anthropological methodology: Useem and Useem's (1955) study on returned Indian students, Coelho's (1958) study on Indian students on an American campus, and Bennett, Passin, and McKnight's (1958) study on returned Japanese students are especially notable in their methods and interpretations.

Very little has been done in the probing of the unconscious, obviously because this method requires a rare expertise and is very expensive. Many small studies are now being undertaken, however, such as that of Spencer (1967).

Ideally many studies should be conducted by a team of professionals from each culture, host and home, since so little is known about testing and interpretation in the cross-cultural field. Further, the team should be composed of professionals in the various behavioral sciences, for both individual and social factors are involved. An approach that has not been essayed is the consideration of the cross-cultural experience as the interaction of the following forces: (a) the individual, with unique personality conditioned by unique family background and personal experiences; (b) the modal press of the home culture; (c) the modal press of the social stratum within that culture; (d) the dominating characteristics of the host culture; and (e) the specific characteristics of the institution attended.

As indicated a number of times, control groups have generally not been used. Admittedly it is difficult to provide a control group of precise equivalence, but research designs could include control groups of relative equivalence, thus separating the factor of overseas study from those of growing up.

Another useful method is that of comparison, as, for instance: (a) comparison of different foreign cultures represented in one institution; (b) comparison of members of one culture at different institutions; (c) comparison of those in different social strata in one culture and in several cultures; (d) comparison of members of one culture at one institution under different conditions, e.g., age, duration of sojourn, fields of study, with or without guidance, etc.; (e) comparison of members of one culture studying in different countries; (f) comparison of foreign students with the American students on one campus.

Particularly needed are comparisons involving different social strata or subcultures, for it seems increasingly clear that race or nationality is less causative than degree of development of the total culture or sophistication of the individual. We know very little about the definition of variables in relation to this approach, but research should not be unduly limited by political or racial boundaries.

New Needs and Questions

Various research aims and approaches have been suggested throughout this discussion. In studying the role of educational exchange in international development, research on the individuals involved is not enough, even if more clearly related to development than is presently the case. An evaluation of international development should take results into account via changed or added structures, curriculum, and projects. The emphasis, in other words, should not be on the static, but on the dynamic. Both learning and development are processes from certain conditions toward others. Research, it is hoped, will develop the tools for the study of human beings and nations in movement.

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FOREWORD

This issue of the REVIEW reports some of the major research and development contributions in vocational, technical, and practical arts education completed since the October 1962 issue. The REVIEW is directed to researchers and potential researchers and attempts to provide a constructive evaluation of significant projects in order to open new research vistas for the reader. This goal may best be accomplished by a careful selection of studies and a creative analysis, synthesis, and interpretation of them to reflect methodological patterns and trends, implications for further investigation, and educational insights gained to date.

No attempt has been made, therefore, to provide comprehensive coverage of the burgeoning literature in the field. Instead, contributions were selected which are representative of well designed and implemented studies that had fewest temporal and/or geographical limitations, answered or provided better understandings of important practical or theoretical questions, or yielded improved techniques or tools for education or research.

Since almost all past reviews dealing with vocational, technical, and practical arts education have been organized by subject field, and because the purpose of the REVIEW is to attempt to provide new insights to guide further research activities, the issue has been organized by problem areas. Hopefully, the different perspective permitted by the format will succeed in revealing conclusions and clues for additional investigations useful in all of the vocational, technical, and practical arts fields.

JEROME MOSS, JR., *Chairman*
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Education

CHAPTER I

Social and Philosophical Framework

ELIZABETH M. RAY

This chapter is concerned primarily with a consideration of the general category of vocational education and is limited specifically to literature judged to contribute to an expanded concept of the social and philosophical justification for vocational education in the contemporary setting. The literature reviewed was limited to the period extending from January 1963 to March 1968, a highly significant time in the history of vocational education.

An Expanding Role for Vocational Education

Social and economic factors, coupled with dramatic changes in political philosophy in this era, have led to an unprecedented interest in vocational education. Problems of unemployment and poverty, coupled with increasing demands for technologically sophisticated manpower, have challenged the imagination of scholars and politicians. The outgrowth of this response is manifest in policies, legislation, and history-making appropriations for social and educational reforms which are related, either directly or indirectly, to the future development of vocational education. For a complete descriptive and statistical summary of federal, state, and local programs particularly designed to serve youth, see *Profile of Youth—1966* in two volumes prepared by the U.S. Library of Congress, Legislative Reference Service (1966). These volumes represent an invaluable resource because they include, in addition to the legislated programs to assist youth, an account of the organized efforts of groups representing professional, social, and religious interests to serve youth.

In the literature of the past few years are several sources of information which can provide perspective on the role of vocational education in the United States. Probably of greatest significance was the U.S. Department of Health, Education, and Welfare report of the Panel of Consultants on Vocational Education, *Education for a Changing World of Work* (1963). The report presented a critical review of the status of vocational education at that time and set forth recommendations which became fundamental to the design of the Vocational Education Act of 1963. The provisions of this landmark act prescribe in large measure the philosophical basis and incentive for recent developments in the field. For an overview of this act and all legislation specifically related to vocational education, including the Smith-Hughes Act of 1917, see *Administration of Vocational Educa-*

tion: Rules and Regulations (U.S. Department of Health, Education, and Welfare, 1966). In addition, the Sixty-Fourth Yearbook of the National Society for the Study of Education, *Vocational Education* (1965), represents a good general reference.

Influences of Manpower Legislation

The designers of the Morse-Perkins Bill, which became the Vocational Education Act of 1963, were greatly influenced by the social, economic, and political realities of the period. Unemployment was high, jobs and people were not well matched, and there was criticism of vocational education for having failed to respond to contemporary manpower needs. At a time when proponents of vocational education were pressing for more extensive support for their programs, developers of the manpower programs were firm in their conviction that preparation for employment was not an appropriate objective of the public school. As recently as 1963, in fact, the Senate Subcommittee on Manpower took the stand that it was important to separate, in concept at least, education from training for specific skills or occupations. They held to the traditional viewpoint that the primary responsibility of the educational system is to teach people to think, not to prepare them for employment. A record of this viewpoint and related positions can be found in a valuable book by Mangum (1965), which contains selections from the 1963 Senate hearings before the Clark Subcommittee on Manpower.

To note recent changes in viewpoint, the reader should refer to Secretary Gardner's report (U.S. Department of Health, Education, and Welfare, 1967) in which he stated that the nation is coming to acknowledge as an essential goal of education its responsibility for a continuing program of vocational education which permits subsequent retraining as it becomes necessary. He also pointed out that as we make a growing commitment to improving systems of education for work, the need for large-scale programs such as those operated under the Manpower Development and Training Act will be reduced.

In the U.S. Department of Labor's recent *Manpower Report of the President and a Report on Manpower Requirements, Resources, Utilization, and Training* (1967), Secretary Wirtz devoted two pages to recommendations relating to the development of abilities through educational programs. In this section he emphasized the importance of an expanded and reoriented vocational education and in so doing again credited the field with the potential to cope with a number of the immediate manpower challenges.

Influence of Social and Technological Change

The President's Commission on Law Enforcement and Administration of Justice (1967), in its task force report on juvenile delinquency, emphasized the need for an improved vocational education program. In a study supported by the Ford Foundation, Burt (1967) reported that industry representatives indicated that they would like to have schools assume, as much as possible, the burden of initial training of new employees.

Not all of the new thrust in favor of an increased role for school-based vocational education is from sources outside the educational establishment. Many of the recommendations have emerged from rather substantial research evidence provided by established professional educators. For example, the American Council on Education report, *Man, Education, and Work* (Venn, 1964), has been widely circulated and the recommendations rather generally accepted. In this study the key idea was that technology has created a new relationship between man and his work. Venn (1967), who since the earlier report has become Associate Commissioner for Vocational and Library Programs, has indicated that we have reached a time when the question of occupational education comes into the same perspective as general education and, further, that the individual does not have an education unless he has occupational skills.

In this context there are two noteworthy reports of attempts to assess the impact of vocational education, one by Eninger (1965, 1968) and another by Kaufman and others (1967). The Eninger study included 1953, 1958, and 1963 graduates of 100 high schools in a stratified random sample having a national base. Kaufman's study focused on nine communities selected from the northeastern sector of the United States and included data from 25 schools. Both studies provide extensive information on the differential impact on students of (a) vocational and general-academic curriculums, (b) vocational and comprehensive schools, and (c) varying school and program facilities. Both studies documented the employment histories and earning capacities of graduates.

The Eninger study has a somewhat restricted meaning because it was limited to boys in trade and industrial curriculums. It does have considerable generalizability, however, because of its national representation and completeness of data on such factors as guidance, physical plant, and student attitudes toward teachers. The Kaufman study was conducted after the Vocational Education Act of 1963 had been in existence for nearly two years; thus, the observations about existing programs and facilities are likely to relate to present conditions. The Kaufman recommendations are carefully detailed and represent thoughtful and sound contributions to the growing body of evidence in support of a more sustained and ordered support for vocational education in the public schools.

Influence of New Curriculum Concepts

In 1965, Nathaniel Frank conducted an institute on occupational, vocational, and technical education. One of the key resultant proposals had reference to a totally new curriculum which would be less dependent on the written and spoken word. Perhaps the most quoted suggestion was that there be a new vocationally oriented educational path to begin at the junior high level (a) for those who have not benefited from the traditional curriculum, and (b) as enrichment for academically oriented, high-achieving students (Frank, 1966). Although the report had mixed reviews, this particular recommendation has been translated into a variety of renewed approaches to educational programing (cf., Howe, 1968).

In the final report of the Education Commission of the States' Ad Hoc Committee on Vocational Technical Education (1968), one of the immediate and urgent goals was proposed to be "the placement of occupational education in the mainstream of education." The details of this proposal and of the total report reflect viewpoints similar to those previously cited. The published collection of hearings (House of Representatives, Eighty-Ninth Congress, 1967) contains statements by many of the members along with those of non-Commission members who are recognized leaders in the fields of manpower and education.

Other than the previously cited sources, there are two rather belated supporters of vocational education's new role. In a 1967 publication, the Committee on Secondary Education of the National Association of Secondary School Principals (NASSP) went on record as believing that the target group for vocational education might be on the order of 40 to 50 percent of the secondary school population. This endorsement reflects the Committee's enthusiastic response to and support of the findings from an informal study by Draper, who was commissioned by the NASSP to study vocational education on a national basis. Draper (1967) presented a highly commendatory picture of existing curriculums and gave strong support for extending vocational programs to serve a larger segment of the school population. His report, *Educating for Work*, contains both the summary of his findings and the position paper by the Committee on Secondary Education of the NASSP.

One further statement, admittedly of rather ambiguous significance, is the National Education Association report of the Educational Policies Commission. Their publication, *Imperatives in Education* (1966), set forth as one of nine imperatives, "To prepare people for the world of work." A chapter in the book discussed the role of work in people's lives from preschool to adulthood and outlined some of the factors in contemporary society which have brought this goal to its present level of importance.

From this vantage point it would appear that "the winds of change" have swept vocational educators from a position of relative obscurity into what is potentially a key position in the educational system. Yet uneasy questions remain: Are the advocates of this new role genuinely committed to a change in the educational system which will affect all students? Are the designers of this new philosophy acknowledged by the educational establishment as the ideological leaders? Are they articulate enough, and do they have the power to ensure that the proposed changes will come about?

Emerging Concepts Related to Vocational Education

History has long since taught us that societies have advanced to higher orders of civilization only when men have been able, under fairly orderly conditions, to receive from one generation and pass on to the next the knowledge, craftsmanship, and cultural values needed to ensure a setting in which men can survive and flourish. According to Boulding (1967), the only key to accelerations in the rate of social evolution is found in new methods of transmitting knowledge between generations. So we ask, what methods of transmitting knowledge have emerged in the past five years? Are the new methods compatible with the need to achieve an orderly, evolutionary advance in which the technological and scientific achievements of a generation will be transmitted systematically and without threat of either economic or social chaos? The recent philosophical and theoretical ideas and the research of a number of social and behavioral scientists would lead one to believe that it is possible, even necessary, to develop manpower policies which recognize the intrinsic value of man and to systematize programs for ends beyond ensuring an orderly demand-supply equilibrium (Socknat, 1967).

Development of Human Resources

Many writers contend that the rate of economic progress depends heavily on the quality and quantity of available manpower at all levels. Manpower is considered the basic resource, and policy is limited to direct labor market activities. In contrast, human resource development includes all levels of education, training, retraining, and intervention with respect to social, psychological, and physical problems as they relate to the productive capacities of people.

Typical of the evolving view which is making its influence felt in new programs and policies is that of the National Manpower Council, a body of private citizens established in 1951 under a Ford Foundation grant. The Council was given the mandate to study important manpower problems and to contribute to more effective development and utilization of the manpower resources of the United States. Since 1951 the Council has published 11 books focusing on selected manpower challenges. The latest book, *Manpower Policies for a Democratic Society* (David, 1965), presented in historical perspective the evolution of the Council's present philosophy. The summary position of the Council was that effective response to manpower scarcities and surpluses will necessitate the United States' investing more heavily in people—in their health, education, and training, and in their capacities and skills.

A program of manpower research was authorized by the Manpower Development and Training Act of 1962. The original objectives were (a) to improve existing manpower programs, (b) to develop new propositions and solutions to manpower problems, and (c) to predict emerging problems. Two volumes of the U.S. Department of Labor on *Manpower Research Projects* (1966, 1967) list and describe all projects funded in the period beginning with 1962. An analysis of the areas of emphasis of funded projects and the major recommendations for the completed studies indicates a trend in the period from seeking solutions to manpower needs toward concern for the people making up the actual and potential labor force. Although these summaries are more heavily oriented to early policy, recent statements indicate that the future emphasis of the MDTA research program has been planned to focus on hard-core, disadvantaged, unemployed, and underemployed people.

In the foreword of a book edited by Cohen and Kapp (1966), Secretary of Labor Wirtz commented on the changing philosophy when he asked why the content of what children are taught should be dictated by what the "system" needs. He stated that we should be assuring every boy and girl the opportunity to develop to his highest potential, whatever his talents and capacities may be. The general conclusion reached by the symposium contributors was that the critical problems of our youth will not be eliminated merely by an improved economic picture, and that temporary crash programs will not provide a lasting solution.

There is increasing evidence that youth need not be pawns in the national effort to keep manpower supply and demand in a viable relation to each other. In reporting a study of unmet needs for postsecondary education in New York State, Knoell (1966) pinpointed a number of difficulties encountered in attempting to relate manpower statistics to educational planning for youth. Colmen (1967), in discussing a related phenomenon, pointed out that we now have at our disposal realistic means to think of human resources in terms of human potential rather than human exploitation. He stated with conviction that long-range manpower forecasting, guidance and counseling, and a modern relevant program of vocational education are mandatory if we are to maximize the human resource potential of the nation. A detailed and technically oriented analysis of emerging developments related to technological advances was made by Harbison and Myers (1964), who related general concepts to conditions in countries which they classified as underdeveloped, partially developed, semideveloped, and advanced.

Investment in Human Capital

A sustained movement from the limited concept of manpower to a broadened concern for human resource development has been paralleled by another development. The concept of investment in human resources as a form of capital investment was introduced by Schultz in 1960 (Schultz, 1963, 1967). Since that time this notion has captured the interest of a number of economists. Although it is not entirely clear to the reviewer whether the increased federal interest in human resource development has grown from a humanitarian concern for individuals or as a practical response to the economic premise that expenditures for education, health, and the general welfare represent sound investments, it is certainly reasonable to expect that the emerging policies acknowledge the relevance of each concept.

Probably the most thorough treatment of the "human capital" concept is found in Becker's *Human Capital* (1964) which combines a theoretical and empirical analysis. The author estimated relative rates of return on college and high school education in the process of explaining the complex issues involved in the concept. The presentation is clearly for the general reader.

Weisbrod (1966) studied the relative appeal of controlling and improving human capital by investing in health or in education and suggested that the more important social benefits from education may defy monetary valuation. In a similar context, Lampman (1966) proposed that there may be a new discipline emerging and suggested that it might be called Economics of Health, Education, and Welfare. The inspiration for his model may be found in books by Klarman (1965), Schultz (1963), and Gordon (1963).

Brazziel (1966) found support for his proposition that general education would have a significant effect on posttraining behavior of subjects in a program designed to provide technical skills for employability. In a related conceptualization, Bennett (1967) examined the premise that level of vocational education was a better indicator of economic development than either general secondary education or the ratio of vocational to general education. The presentation raised several provocative issues worth examining.

Swift and Weisbrod (1965) studied the influence of education in one generation on the status of the next generation. They found that as the number of children in the family rises, the average education of each child falls and acknowledged that rates of return on female children are lower than for males. Within the limits of their design, however, they were able to conclude that there are positive intergeneration benefits from education.

Whether for meeting demands of the labor market, for maximizing the development of available human resources, or as wise investment policy, the case for advancing the general welfare of individuals appears to have considerable validity. Although this viewpoint has reference to all areas of human need and human endeavor, the role of education as a key element has been generally acknowledged.

Equalization of Opportunities To Develop

Regardless of the rationale, it is agreed that by maximizing the opportunities for individuals to become economically independent, a nation enhances its social and economic stability. Although the framers of the Constitution decreed that all men are created equal, at no time in the history of this nation has there been an unequivocally acceptable interpretation of the concept "equal." However, in this age of intellectual sophistication and technological revolution, evidences of inequities in both social and economic realms have emerged as sources of embarrassment for the nation as a whole. Unequal distribution of opportunity leads to unequal access to available resources, then to dissatisfaction, and eventually to social revolution. National attention to problems of disadvantaged groups may be equally out of concern for individuals and concern for the social and economic stability of our society. Kemp (1966), in an incisive and insightful cataloging of the issues and the challenges to vocational education, pointed out that for the socioeconomically handicapped youth, the only reliable solution is education and training.

To accept Kemp's premise does not imply that the question of what education for which purpose has been resolved satisfactorily. Much of the effort to bring corrective measures to bear on recognized inequities has been quite straightforward. The activists have matched solutions to problems whose origins appear to be self-evident; nonetheless, there are individuals with a philosophical bent who are not convinced that the issue is completely clear. Anderson and Foster (1964), in an analysis of inequalities in education, have pointed out that the label "discrimination" may apply to differentiated treatment which has resulted from policy, or it may be applied unofficially through prejudiced stereotyping. They have suggested also that a distinction should be made between "unequal access to education" and "inequality of educational attainment." Along this same line of questioning, Komisar and Coombs (1964) have brought another interpretation into the issue by differentiating between "sameness" and "fittingness." Macmillan (1964-65) continued the discussion by pointing up certain inadequacies in the Komisar and Coombs argument and contending that these two concepts are a part of the meaning of "equality," but not in any sense the whole meaning. And finally Kleinberger (1967), in what is essentially an extension of the same discussion, has analyzed the problem of equality in education by asking if one is seeking "identical treatment" or "identical result."

There is an abundance of literary evidence to indicate that in recent years the attack on inequality has been increased. Concern with desegregation and with granting rights is consistent with the notion that identical treatment will in itself correct inequalities. Efforts to diagnose the results of disadvantage and to provide compensatory treatment favor the position that unequal treatment is necessary in order to ensure identical or equal access to the social and economic advantages of the society.

Compensation for Inequities

Martin Deutsch (1964) has estimated that 40 to 70 percent of the school population in our 20 largest cities are disadvantaged by virtue of their living in marginal social and economic environments. He has pointed out that it is becoming increasingly important for the individual to have education adequate to allow him to enter the job market with a skill. Thus, he holds, it is a social necessity that we give attention to the educational process and especially to ensuring that children from marginal environments participate. In his thorough overview of the phenomenon, he proposed as a basic assumption that there is a continual interaction between environmental experience and psychological development.

In 1964 at a Research Conference on Education and Cultural Disadvantage, invited experts reviewed what is already known about associated problems and recommended some unusual solutions. In the summary of their working papers, *Compensatory Education for Cultural Deprivation* (Bloom, Davis, and Hess, 1965), are a number of recommendations and accompanying justifications, including several which have since become a familiar part of the educational effort to build compensatory programs. For example, the recommendation that nursery school and kindergarten experiences be provided has resulted in the highly publicized Head Start Program operated through the Office of Economic Opportunity. Another set of recommendations relating to work-study opportunities has been translated into a number of formal and informal programs even though it was one of the less popular elements in the Vocational Education Act of 1963. Other recommendations emphasized the importance of providing an integrated setting for learning and a sustained remedial program at each educational level to ensure mastery of the basic or tool subjects. The book contains a 134-item bibliography utilized by conference participants in support of their recommendations.

In *Compensatory Education for the Disadvantaged,* Gordon and Wilkerson (1966) presented a cogent account of the history of, theoretical basis for, and status of compensatory education. In addition to providing an essential guide to exemplary programs of every size and description, the final chapter, a critique of compensatory education, is exceptionally effective in bringing the reader to the realization that relatively little sustained effort has as yet been expended.

Elimination of Inequities

It is safe to say that the general problems of disadvantage have been more responsive to special attention than the specific ills associated with unequal educational and occupational opportunities which have grown out of intentional and accidental segregation such as exists in urban areas.

The issues have been treated quite fully in the highly controversial Coleman report and reexamined with feeling by several critics of the methodology and conclusions of his study. Coleman and others (1966), in a study sponsored by the Office of Education, assessed "the national situation regarding the lack of availability of equal educational opportunities for individuals," and found it wanting on most counts. Because so many individuals have taken issue with the conclusions of the Coleman report, the reviewer has evoked the concept of "equal time" and cited only one representative critique. The extended discussions and carefully documented paper by Stodolsky and Lesser (1967) dealt objectively with many of the criticisms and issues of interpretation. The Coleman report is so extensive and touches on so many important points of concern that it is difficult to present one generalization to represent the total. It must be read to be believed.

In a more detached discussion of the general problem of providing equal educational opportunities, Pettigrew (1967) identified the unresolved issues as associated with political pressures, assignation of responsibility, and methods of achieving racial balance in the schools in addition to or in place of desegregation.

The problem of equal opportunity extends beyond the school, of course. Kovarsky (1967), in a conference on human resource development, surveyed the status of the Negro worker up to the present and detailed a somewhat pessimistic prospect for his being afforded equal access to jobs and to the concomitant benefits of an increasingly affluent society. This issue has repeatedly confronted the manpower policy makers and especially the administrators of the Manpower Development and Training Act programs. In the U.S. Department of Labor's *Manpower Report of the President* (1967), compensatory efforts on behalf of the hard-core unemployed were discussed in conjunction with a planned redirection of the MDTA programs. The proposal called for expending as much as 65 percent of the future training effort for programs to reclaim and rehabilitate persons classified in this group.

The Civil Rights Act of 1964 focused on racial and ethnic inequalities; women form another segment of the population which has been subject to differential treatment in the employment market as well as in society in general. In 1962, President Kennedy named a commission to study the status of women. The commission was directed to develop recommendations for overcoming discrimination on the basis of sex and for suggesting services which would enable employed women to continue their roles as wives and mothers. *American Women*, edited by Mead and Kaplan (1965), contains the commission report plus data on the status of women relative to education, employment, protective labor legislation, social insurance and taxes, and in civil and political life. The report represents a review of the progress which has been made, yet it uses standards of comparison such as those used to judge the progress of other disadvantaged groups.

Women's rights have not been fully realized, nor have their potential contributions been fully exploited.

Through custom and historic precedent women have been treated differently from men, and this has meant almost without exception that they have been given less opportunity, less pay, and less consideration in the labor market. As outmoded attitudes and practices are changed, the status of women can improve. Sylvia Lee and others (1967) have compiled statistics on women's work patterns and have presented recommendations for each of the vocational fields which may well serve to encourage increased attention to the need for programs which serve women as well as previous programs have served men. Lee has suggested that essential to a more realistic education program for girls and women are better communication, a research base for making predictions, and more guidance for girls by personnel who understand the issues.

One may assume that in making a commitment to maximize opportunities for individual development, the nation faces a continuing challenge. As the economic and educational level of the general population rises, there will continue to be segments of the society which are thrown temporarily into disadvantageous positions relative to the whole. While the government and public are concerned with bringing into the mainstream the 25 percent who are poor, unemployed, unhealthy, and alienated, the 75 percent who are well entrenched in the so-called good life of the late twentieth century represent our present hope for the future.

Occupation as a Source of Personal Identity

In *Work and the Nature of Man*, Herzberg (1966) proposed that the primary function of any organization should be to implement the need for man to enjoy a meaningful existence. The author questioned the value of achieving material comfort at the expense of human happiness. Herzberg's theory involves a balancing of man's need to realize his potential for growth and perfection and his need to avoid deprivation. The data are interesting and the chain of reasoning clear.

Morgan, Sirageldin, and Baerwaldt's *Productive Americans* (1966) presented extensive data from a representative national sample of families for the purpose of documenting ways in which individuals contribute to progress. The study sought to examine basic attitudes and motives that affect work behavior. The authors concluded that success leads to success, while failure or distress reinforces attitudes which stimulate failure-prone behavior. Morgan and his associates concluded that the most powerful force in the cumulative cycle was formal education.

Work and Motivation, a book by Vroom (1964), represents a selective analysis of individual behavior in relation to occupational choice, job satisfaction, and job performance as it has been investigated on an objective basis in more than 500 studies. Vroom has evolved several rather sophisticated hypotheses and a model for studying motivation, work, and satisfaction. Gellerman's *Motivation and Productivity* (1963) had what would appear on the surface to be purposes similar to those of Vroom. However, Gellerman discussed a highly selected set of concepts including such classics as May's "Hawthorne effect," McClelland's "achievement motive," Schachter's "affiliation motive," and White's "competence motive." In addition, he gave a general overview of a number of concepts relating to man's reasons for working.

Whether one works to demonstrate his competence, to ensure that he will have opportunities to interact with peers, or to achieve in any of a variety of realms, the impression is clear that work, regardless of how it is defined from generation to generation, is an important means of assuring man's humanity. Vocational or occupational classification serves to communicate social status; therefore, if one has no occupation by which he can be identified, or if his occupation is not suited to the social role he wishes to assume, one may expect difficulties in adjustment and tendencies to antisocial behavior on the part of the affected individual.

In a series of essays, Super and others (1963) have given an overview of the process by which research efforts have led to the proposition that an individual, in selecting an occupation, is at the same time seeking to implement a self-concept. Super and associates have evolved a vocational development which should be useful to individuals who are implementing the curriculum concepts which incorporate occupational education into the experience of all students. In this setting it will be readily noted that vocational education aims for more than providing manpower for the economy.

The studies cited are representative of a growing body of literature (reviewed further in Chapter III, "Career Development") which has examined the underlying meaning of productive behavior in humans. As a result of perceptions thus gained, social scientists may eventually achieve the model society in which men and machines can coexist in a mutually beneficial milieu.

People Versus Progress

Anderson (1964) in *Dimensions of Work* has proposed that ours is largely a work culture. He devoted several chapters in his book to considerations involved in choosing an occupation and finding satisfaction in work. He has pointed out that while work is undergoing evolutionary changes within a rationale advocating planned and efficient change, critics are contending that change goes on as if people did not exist. In this context the nature of work, the role of technology, and problems of time and leisure were discussed in terms of their influence on man's adaptation to a changing society. In another book which deals in considerable detail with the "rapidly changing social system," Alfred McClung Lee (1966) has reviewed social and anthropological positions to support the notion of man's continuing conflict between his tendency to conform and his desire for individuality. Lee brought attention to the interaction of individual and society and discussed topics such as group culture, social structure, enterprisers and bureaucrats, creators and technicians, and the concept of marginal man. The author proposed that in a many-valued society man may become many-minded.

Although there appear to be no clairvoyant contributors to the literature of the past five-year period, there were individuals and groups who had given serious consideration to the prospects for man in future societies. In *The Accidental Century*, a long essay, Harrington (1965) has written provocatively of what he calls "contemporary decadence." Harrington suggested that political reforms are needed to bring order to the revolution presently in progress.

Two small books containing wisdom well beyond their size are Gardner's *Self Renewal* (1964) and Hoffer's *The Ordeal of Change* (1963). Gardner's message is that people create their own environment and their own society by the values they espouse. Hoffer has suggested that change is not necessarily bad, even though the process is almost universally painful for individuals.

The Future Prospect for Vocational Education

Despite the impression that the foundations of vocational education are firmer than at any time in its history, the Advisory Council on Vocational Education (1968) did not find much empirical evidence that programs had made significant gains since 1965 when provisions of the Vocational Education Act of 1963 went into effect. Although they were critical of leadership and administrative inadequacies during the period, they tended to be optimistic about the future and made recommendations which are seemingly designed to emphasize the need to deal aggressively with certain persistent problems.

To this reviewer, the future status of vocational education appears to be contingent on at least two major considerations. First, the field of vocational education must itself respond to the demand for a quality product. The concept of an expanded role for vocationally or occupationally oriented objectives must be implemented. The initial phase of this new thrust must await the development of a viable model for the program and a marketable general and technical curriculum base. Degree of success will be related to the model curriculum's capacity to extend the teacher's role through utilization of technological resources and by strategic use of industry and the marketplace as the laboratory for vocational education. Particular attention must be given to the fact that when vocational programs expand, some other facet of the educational program must accommodate the expansion. Innovative proposals originating from well documented premises which have been fully supported by individuals in administrative and leadership positions must be sold to communities and schools.

The second consideration is related to the observation that the framework for vocational education has tended to be, and is presently, more responsive to political and economic factors than to philosophical positions. If there is validity to the argument that vocational education belongs in the mainstream of education, then the justifications are social, psychological, and cultural. Vocational education for all can be affirmed by educational leaders at the national level as the look of the future. Thus one can propose that an educationally sound program of studies should include opportunities for every student, regardless of his ability or his educational aspirations, to develop a marketable skill of his choice before completing the twelfth grade.

In a setting where accreditation of the school is contingent on there being opportunities for all students to fulfill the requirement of achieving a marketable skill before graduation from the twelfth grade, vocational educators may be asked, quite legitimately, to justify their curriculums. However, it will have marked the end of the condition which has required vocational educators to justify their existence in the educational system.

With minor exceptions, leaders in government and in education have acknowledged the powerful potential of vocational education. The literature abounds with affirmations of belief in the essential value of having all schoolchildren develop a concept of themselves as being able to get and hold a job. This is seen as compatible with the expectation that society will demand higher levels of educational attainment and increasingly diverse vocational preparation. The future of vocational education appears to be one of challenge and opportunity.

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CHAPTER II

Manpower Supply and Demand

JACOB J. KAUFMAN and ANNE F. BROWN

One of the basic principles underlying the Vocational Education Act of 1963 was that youth would be trained for occupations (supply) for which society has a need (demand). This is based on the assumption that labor economists would project the needs of society and that vocational educators would adjust their programs accordingly. The purpose of this chapter is to review the literature on manpower supply and demand to determine the extent to which this objective of the Vocational Education Act of 1963 can be achieved.

Since this is the first time an entire chapter of the REVIEW has been devoted to the subject of manpower supply and demand, a general and theoretical approach will be employed at first in order to illustrate some of the major issues, followed by a more detailed summary of research in the subject area.

Manpower Policies

Education may be considered either as an investment good or as a consumption good. It is the former which is more relevant to manpower policy on the assumption that education can increase the economic well-being of society. One of the objectives of manpower policy is to remove the discrepancies between the supply of and demand for manpower with a minimum of lost income and production.

Bombach (1965) discussed the philosophy behind manpower forecasts and concluded that there are several similarities between education and infrastructural investment. Levitan and Mangum (1967) discussed present-day manpower policy, its achievements and failures in the past, and its prospects for the future. They recommended a unification and coordination of operating agencies. Harbison (1964) defined manpower policy as a combination of employment policy (aimed at providing employment opportunities for all those willing and able to work), human resources development policy (designed to increase the skills, knowledge, and capabilities of the labor force), and manpower allocation policy (specifically aimed at matching men and jobs). It is the human resources development policy which is essentially concerned with education and training. Harbison, pointing out that relatively little research work has gone into studies of manpower and educational developments, listed a few of the more important areas requiring further research.

Developments in manpower policy during this decade have been dramatic: e.g., the Area Redevelopment Act of 1961, the Manpower Development and Training Act of 1962, the Vocational Education Act of 1963, and the Economic Opportunity Act of 1964. Yet, as will be discussed later, in spite of the attempts made to reduce unemployment and to combat poverty by these measures, a greater impact on the rate of unemployment was probably achieved by the tax cut of 1964 and the escalation of the Vietnam war. Mangum (1966) stated that the more rational approach was to supply jobs first through fiscal policies and then to concentrate on the structural maladjustments. Margaret Gordon (1964) summarized the main arguments in the controversy between those who believed that the high level of unemployment was due mainly to deficiencies of aggregate demand and those who emphasized structural maladjustments.

It does appear, however, that policy developments as reflected in legislation have run ahead of progress in research. It was realized as early as 1961 that there had been few improvements in either concepts or measurements of manpower. The President's Committee To Appraise Employment and Unemployment Statistics (1962), chaired by Gordon, was set up to investigate these areas. The Committee report recommended certain improvements, including more research in sampling, seasonal adjustments, and state and local data. The report also pointed out that one of the most conspicuous gaps in labor-force information was a series on unfilled jobs.

Although some improvements have occurred since the Gordon report, apparently more are needed. Striner (1966) explained how a complete research strategy should be formulated with an emphasis on the development of methodological models and evaluative techniques for judging the effectiveness of manpower programs. Many attempts have been made to project both manpower supply and demand, in total and by occupational and industrial groupings. The straightforward method of extrapolating trends has usually appeared as reliable as the approach using complex theoretical models, which perhaps indicates a greater need for theoretical and conceptual research rather than a concentration on empirical studies.

Most of the developments in manpower planning have taken place within government, either at the national or state level. However, in recent years, there has been an increase in private manpower planning at the individual firm level. Wallenstein (1966) presented an introduction to the principles of technical manpower planning. The main objectives of this planning are for costing purposes and system analyses. By cooperating with the educational institutions of the community and the local branches of the state employment service, however, firms can make their own requirements known and can contribute to a situation of equilibrium in the local labor market.

The Interaction of the Supply of and Demand for Labor

Unfilled jobs and unused human resources are a constraint on any nation's economic growth. The latter, or unemployed labor, is essentially the gap between the total supply of and demand for labor when labor supply exceeds the demand. The former, or job vacancies, is the gap when the demand is greater. Yet both can occur at the same time because of structural deficiencies of the economy and imperfections in the structure and behavior of labor markets.

Ross (1966) explained the concept of labor shortage and how a shortage could exist even when there were no actual unfilled vacancies. One possible explanation for a shortage was that a change in consumer preference could cause a sudden upsurge in demand for one product before supply adjustments could take place, particularly in those occupations which require a long training period.

On the other hand, and perhaps at the same time, automation and a shift in demand away from a product can cause unemployment for certain other occupations. Unemployment may result from a geographical imbalance which could be remedied by migration or from overall occupational imbalance which can be remedied only by retraining. Unless forecasts of manpower requirements can be made more accurately, the prime solution to this structural unemployment in a time when technological change is a continuing process and shifts in demand are common is to have a labor force which is more mobile and which can adjust quickly.

Cassell (1966) thought that the only method to close the "employability" gap was by meaningful training programs. He illustrated this with the statement of Gardner Ackley in October 1966 that jobs for the "unemployed must come through qualifying applicants to fill vacant jobs rather than through increasing the number of jobs." There are two main disadvantages to this approach: (a) many of the unemployed need more than a skill training to fit them for entry into the labor force; (b) even if the skill training were sufficient initially, future shifts in demand may render the training inadequate.

A controversy exists between those who believed that the continuing high rate of unemployment was caused by an inadequate level of aggregate demand and those who thought it was caused by basic structural changes in labor supply and demand. Inadequate demand is due mainly to cyclical variations and lack of suitable economic growth, while structural maladjustment is caused by technological changes, changes in regional industrial structure, and market changes reflecting shifts in consumer tastes and preferences. The differences center around the measurement of the relationship between inadequate demand and unemployment, or the structural change and unemployment. Furthermore, in many cases it is hard to separate the effect due to inadequate demand from that of structural variation. The empirical studies may be in favor of either one, according to the different sectors under consideration, the different time period covered, or even the different regions and different countries studied.

Killingsworth (1965) was a strong proponent of the structuralist side. He held that no fiscal measure could hope to reduce the rate of unemployment sufficiently, and might indeed have adverse inflationary side effects. Automation and shifts in consumer demand were to him the basic causes of the skill imbalances, affecting in particular the unskilled worker. In other words, high-level economic activity and approximately full employment would still leave pockets of unemployed labor because of structural imbalances.

Statistical analyses have been undertaken in attempts to prove or disprove the structural imbalance theory. Stoikov (1966) examined unemployment for various sectors which were suspected of having suffered disproportionate increases in their unemployment rates and found a definite upward shift over time. On the whole, and in the absence of convincing alternative arguments, he found the "mild" structuralist position plausible. On the other hand, Gallaway (1963) did not find it valid, although he qualified this by allowing for the possibility that the relative price of labor in general had been increased by the actions of labor unions to a level generating widespread unemployment.

More recently there has been support for the view that both effects can coexist. Gilpatrick (1966) suggested that the two types of unemployment not only could exist but in fact could reinforce or offset each other, depending on the particular combination of circumstances. Simler (1964) concluded, after a statistical exercise, that even if the problem is a pure case of deficiency in aggregate demand, both fiscal-monetary policy and labor market policy are required to reduce unemployment without inflation. Other people argue that, in a sense, there is always a structural component in total unemployment. R. A. Gordon (1964) admitted this but went on to say that, at least for the aspects which he had examined, structural unemployment had not worsened relatively since the mid-fifties, which therefore implies that the rise in unemployment over that period must reflect primarily a lack of aggregate demand.

Theory of Manpower Supply and Demand

Different approaches are possible for estimating education and training requirements. The educational planner is in a predicament. He is told, on the one hand, to use estimates of the industrial demand for manpower skills and, on the other hand, to use estimates of the social demand for education. At the same time, the economist is asked to justify alternative investment decisions.

The educator needs to recognize these alternative choices and should also take account of both the industrial and social demand for education. Manpower forecasts representing the industrial demand for education, however, are often inaccurate. Eckaus (1964) has also explained the difficulties in projecting the social demand for education because of the problems of identification and measurement of social costs and benefits. The following sections will summarize the recent studies which improve our knowledge of the determinants of manpower supply and demand.

Demand for Labor

In the examination of demand for or supply of labor, it is important, of course, to take account of price—since more individuals would seek employment if wages were sufficiently high, and employers would hire additional workers if wages were sufficiently low. In general, demand for manpower is influenced by (a) demand for goods and services and (b) state of the technology.

Demand for Goods and Services. Demand for manpower will be dealt with first as a function of demand for goods and services. A change in demand for goods and services will affect the individual firm by either a movement in price and/or production, depending upon the nature of the firm's capital and inventory structure, the degree of price competition in its market, and the state of the labor market. Kutscher and Jacobs (1967) discussed in their model the changes in industrial employment resulting from a combination of three factors—final demand, employment-output relationships, and interindustry relationships.

The production response, itself a result of an increase in demand for the end product, generates a secondary demand for resources, men, and materials, depending on the product mix. An increase in demand will lead to overtime and/or new job vacancies; conversely, a decrease in demand prompts layoff and cancellation of job vacancies or a shortening of hours. Dealing with the latter, Mincer (1966a) attempted to describe some of the analytical insights which the joint availability of data on job vacancies and unemployment may be expected to provide.

The size of a firm's demand for labor will rest on the interplay of numerous variables. Therefore, in contemplating any rise in wage rates in order to attract additional workers, a company must consider that a rise in unit labor cost may cause a decrease in demand for the product. Within the confines of an economy's institutional framework (government minimum wage rate regulations, competitive strengths, union strength, etc.), a firm will tend to seek, initially, to hire productive workers at relatively low wages. If the labor market response fails, the firm will either seek less productive workers or pay higher wage rates. Similarly, the average worker, on entering the labor market, will reject offers of employment below his minimum acceptance wage, but will probably lower his expectations as the amount of time spent in job-seeking activities lengthens. The criticism of this analysis is that it deals with only one important factor in the individual's acceptance of employment and chooses to ignore the elements of working conditions, psychic benefits, and so forth.

Holt and David (1966), using the above-mentioned concepts in their theoretical presentation on the interaction between the number and characteristics of the unemployed and job vacancies, demonstrated the relationship between the rate of change of money wages and level of unemployment in equilibrium conditions. They emphasized that the fear of inflation is a very important restraint on the removal of unemployment by increasing aggregate demand.

Eckstein (1964) presented his theory in a qualitative rather than quantitative form and attempted to digest the empirical findings of recent years concerning the behavior of wages, prices, and productivity, specifically in the manufacturing sector. Behman (1964) also used data collected from the manufacturing sector to test empirically a dynamic model she has constructed in an attempt to show that if labor market operations are viewed in dynamic terms, then the effect of increasing labor demand on labor mobility can provide a satisfactory explanation for money-wage-rate increases during the entire post-World War II period.

State of the Technology. Demand for manpower is also a function of the state of the technology. The direct impact of the state of the technology may be that capital is substituted for labor. Some jobs will be abolished, although others may be created. The economic dimensions will be measured by the firm in the savings per unit of output achieved. There may also be secondary consequences from one production area upon another in the economy.

Fabricant (1965) claimed that technological change might affect labor more than capital or one type of labor more than another. The situation might be such that, as some have claimed, technological changes in recent years have seriously diminished the demand for unskilled labor and vastly increased the demand for the highly skilled. Thus, a more serious adjustment problem would occur, according to Fabricant, than if technological change were neutral and had a uniform effect upon all kinds of labor.

Technological changes involve occupational changes and, therefore, alterations in skill requirements. In addition, the frequency of occupational changes is an important variable in the manpower adjustment process, for a gradual alteration of labor requirements allows a gradual adjustment in labor supply. Moreover, the range within which skills are interchangeable and the particular degree to which they are substitutable in the production process depends on the state of the technology.

Sultan and Prasow (1965) cautioned against drawing any general inferences for future manpower needs from isolated case studies of advances in technology. They noted that it is tempting to work back from the defined problem to identify the technology associated with the problem, but that the mere fact of association should not be taken as causality. Rather, it is a wide range of environmental influences and market parameters that combine to determine manpower needs. In addition, they stressed that labor requirements are strongly influenced by the degree of integration of the machine into the production process.

Crossman (1966) viewed present technological changes as creating instability in the relationship between production and employment. His observations on the current impact of automation were directed toward the formulation of a unified technological-economic model of the situation.

Supply of Labor

The labor force, as presently defined, is equal to the sum of the employed and the unemployed workers. When examining the supply of labor, however, it is necessary to take into account the distinction between the potential and the actual labor force. The former includes those who would have desired work under different conditions; the latter includes only those who desire work at that particular point in time. The supply of labor may also be modified by changes in the hours of work. Much research has been completed during the past five years on factors affecting the size of the labor force. First, of course, there is the rate of population increase and the breakdown of the population by age and sex, but the problems involved therein are more concerned with scarce or inadequate data than with theoretical or conceptual problems. Second, there are nonparticipants in the labor force, such as those excluded by age and those alienated by either lack of education or other socioeconomic factors.

Labor Force Participation. Stein (1967) attempted to determine the reasons for nonparticipation in the labor force and divided the findings into voluntary or nonvoluntary categories. The former included housewives and students, while the latter included those with physical disabilities, those unable to arrange child care, and those who believed it would be impossible to find a job. Voluntary nonparticipation thus occurred when the marginal utility of studying or of leisure was greater than the marginal utility of income.

Changes in the supply of labor can occur in response to short-run changes in the demand for labor. Mincer (1966b) gave a concise review of the evidence available on labor force participation in response to changes in demand for labor. The theory is, very simply, that a decrease in the demand for manpower causes a fall in participation rates by discouraging primary workers. But, eventually, if the decreased demand sufficiently affects the family income, there will be an offsetting effect because of the incentive for secondary workers to enter the labor force in order to maintain their incomes.

Bowen and Finegan (1965) showed in their study that there was a strong net positive sensitivity of labor force to employment: i.e., a decrease in total employment, indicating a reduction in demand, caused a decrease in the total labor force participation rate. Strand and Dernburg (1964) demonstrated a striking confirmation of both the additional worker and the discouraged worker effects. Tella (1964) pointed out that between 1956 and 1962 the total labor force would have risen by 6.5 million instead of by 4.3 million if demand had remained static.

These studies reveal one way in which the original definition of labor supply is oversimplified. If there is a situation of less than full employment, there may be hidden unemployment reflecting the degree of labor force responsiveness to short-run variations in employment conditions. Mincer (1966c) pointed out the greater labor force sensitivity of females and of extreme age groups, which is inversely related to the degree of labor force attachment of individuals and groups.

Another cause of nonparticipation may be rigidities in the structure of the labor market. Union restrictions may prevent a nonunion member from entering a trade in order to protect the members' own interests. Collective bargaining agreements and governmental action in the raising of minimum wages may prevent the youthful unskilled worker from obtaining employment. Although the action would be intended to improve the situation of the lowest paid workers, it may not be economical for the employer to hire them if their marginal productivity is lower than the wage.

Labor Mobility. A mobile labor force can make supply adjustments less painful. Mobility can be either occupational or geographic (the ability to move between states). The former will enable adjustment to occupational imbalances of supply and demand and the latter to regional imbalances.

Saben (1964) pointed out that work-related factors (to take a job, look for work, or make a job transfer) accounted for half of the migrants, while Gallaway, Gilbert, and Smith (1967) found that per capita income differences are significant determinants of interstate population movements. Briefly, the major reasons for geographic mobility are to avoid unemployment and to achieve economic and noneconomic gains. The same is probably true of occupational mobility. The U.S. Department of Commerce (1964) found that the main factors influencing mobility of persons in depressed areas, however, related not only to economic and occupational reasons but also to family and community ties.

Differences in labor mobility can be found in terms of education, age, sex, race, industries and occupations, pension plan, and social and psychological factors. High mobility potentials are typically found among college graduates, young workers, men, those with vested pension plans, and among white, professional, and white-collar workers (Gallaway, 1966; Fein, 1965). There is much room, however, for variations in mobility patterns. For example, according to Bancroft and Garfinkle (1963), the highest rate of job change is for men in construction industry, craftsmen and operatives, and for women in trade and clerical work.

The most mobile occupational groups are professional, technical, and managerial employees; self-employed people seem to be the least mobile.

The principal barriers to mobility are home ownership, cost of moving, and emotional attachment to friends, relatives, and communities. Findings show that unfavorable patterns of mobility result with a labor force that is relatively older, less educated, less skilled, poorer, and has a history of low migration propensity. However, Stern and Johnson (1968) demonstrated that there is a possibility of shifts from blue- to white-collar workers in response to the changing demand for labor, and that this shift can be encouraged by appropriate governmental action.

Geographic, intra-interoccupational, intra-interindustrial, and intra-interlabor market labor flows all help to bring the supply of and demand for manpower toward market equilibrium. As pointed out by Gallaway (1963), however, there are several factors which prevent equilibrium throughout the whole system: (a) noneconomic barriers of labor mobility; (b) private economic costs accompanying labor migration; (c) nonhomogeneity of the labor units; (d) difference in preference function of workers; and (e) a failure of maximizing workers' utility function. Moreover, both employers and unions may purposefully distort the competitive market mechanism (Ulman, 1965).

As long as these imperfections of labor markets exist and our goals are low rates of unemployment at stable prices, efforts should be made to improve labor mobility through general education, special training, and relocation programs. As Raimon (1964) pointed out, if the labor market is to achieve full employment at stable prices, including full employment for nonwhites and ill-prepared youths, progress can be obtained either from increasing wage flexibility or from increasing labor mobility, or from both. More market information provided by government and private institutions may be helpful in facilitating labor mobility.

Quality of Labor. The other aspect of the supply of labor which cannot be neglected is the quality of the labor force. Quality in this sense is an arbitrary term covering education and training, age and experience, motivation, and all of those factors which affect the ability to do a job efficiently. There is still insufficient research in this area. This explains, in part, the debate between those who advocate narrow, skill training and those who advocate a broader education. The basic but unanswered question is this: Which form of education has a greater positive effect on the quality of the worker?

Research Requirements for Manpower Analysis

Despite the improvement made in recent years, projections of manpower for use by vocational educators are still subject to considerable error, and certain limitations should be recognized. Not only may the assumptions be incorrect or incomplete, but the data are likely to be inadequate, and the statistical techniques themselves may be subject to error. The projections can be used to indicate approximate magnitudes and directions of movement rather than exact ones.

Manpower Requirements

An important source of information on manpower needs lies in the area of job vacancies. Access to this kind of data would aid the individual firm in the anticipation of labor shortages in a specific occupation and help with the necessary steps for coping with them. It would also assist the firm in a cyclical analysis to help prepare regular sales and profits forecasts. Finally, the firm would be in a position to estimate the labor supply in individual localities vital to plant location. For the economy as a whole, job vacancy data would serve as (a) an additional measure of economic fluctuations, (b) an important tool in the identification of relief of bottlenecks in production, (c) an implement in the more effective use of training and retraining programs based on more reliable employment opportunity indicators, (d) an aid to vocational counseling by educational institutions, and (e) an accurate reflection of existing vacancies which would aid in the more efficient allocation of the existing labor force.

The implementation of any program of job vacancy data collection has been the subject of much discussion and intense debate among economists and public administrators. Dunlop (1966) explored the conceptual problems related to the collection and interpretation of job vacancy data and treated what he considered to be the difficulties obstructing the meaning and value of job vacancy data in the United States today. Levine (1966) viewed as feasible the collection of job vacancy data within the framework of the United States Employment Service (USES) and cited examples of successful experiments by certain cities with collection of job vacancy data by the employment service of individual states. His focus was upon the primary application of job vacancy data by the USES to the development of local manpower training programs and the guidance of the nation's unemployed. Joseph (1967), however, questioned whether job vacancies are equivalent to the excess demand for labor, and he recommended caution, since haste to use vacancy data may mean the sacrifice of careful research on the significance of such data.

In the United States, efforts to collect data on demand for labor have been sporadic and are still in the formative stages. The need for such information is clear, but its implementation on a national scale remains embryonic.

Labor Force Projections

More data are available on labor supply than on labor demand. In addition to the population census, there are the Current Population Survey, the Bureau of Labor Statistics Survey of Scientists, Engineers and Technicians on Industrial Payrolls, and operating statistics accruing in the

Social Security Administration. But more data are again required; some can be obtained from improvement of existing surveys, but others require the formation of new surveys.

The population census, which is a major source of data, has a system of classification which is far from perfect. Scoville (1965) criticized the socioeconomic groupings. Many of them are far from homogeneous; jobs may be placed in the wrong categories, which themselves are so broadly defined that all similarities are lost. Recently a slightly different system has been tried. But for complete clarity, a very different approach will be needed.

The other major source of data is the Current Population Survey. Morton (1965) examined this survey to determine its analytical potential for manpower research. He found that, although there is a rapidly accumulating store of data, much of it is not being fully utilized. He suggested that the data-producing agency should improve access to the information for bona fide research workers. Since the Current Population Survey is a sample survey, he raised questions about quality and statistical reliability of the results. Errors in the data are by no means limited to sample estimates; nonsampling errors may be equally or more important.

One of the difficulties in achieving the most efficient utilization of the available data is the multiplicity of relevant statistical sources. Before proceeding to expand existing surveys and introduce new ones, it is advisable to collate, match, and link all information. Disaggregation of existing census material would also permit analysis on a local level or within an industry.

The U.S. Department of Labor (1967) specified two areas of data deficiency. First, current occupational information is inadequate, and second, information on occupational mobility and related factors is almost completely lacking. Both of these are of utmost importance for supply projections, although the former is also of importance for demand projections.

Problems and Methodology in Manpower Analysis

Manpower projections can take a variety of forms, depending on the purpose of the projection, the time element, the availability of data, and many other factors. One has first to decide whether an unconditional forecast of what will actually occur or a conditional projection according to certain specified assumptions is required. Goldstein (1966) discussed this question and specified different purposes of manpower projections: for example, the vocational guidance of individuals or the estimation of expansions needed in educational programs. He then explained the basic elements in the projection of supply of and demand for manpower. The U.S. Department of Labor (1963) went further by explaining in detail the basic steps involved in manpower projections.

A projection of labor supply is a more complex procedure than a projection of demand when one is considering a breakdown by occupations or skills, which is the most useful breakdown for an educational planner. Total labor supply is, however, easier to project, for demographic projections and the theory of labor force participation have been well developed. Grais (1966) considered manpower requirements by occupation and skill and manpower supply by type and level of training. The difficulty is the forecasting of occupational mobility. In their lifetime most people take up a number of different occupations which may or may not be related to their initial training.

Medvin (1967) described methods which are currently employed by the government in forecasting long-term manpower requirements. One method, developed by the Bureau of Labor Statistics, involved the preparation of an economic model by building up the demand for each product in an industry, the manpower requirements of each industry consistent with this demand, and, finally, the development of an occupational matrix. The other approach is the area skill survey which depends primarily on the employers' own estimates of future occupational requirements. Many people have been wary about the reliability of this method.

Swerdloff (1966) considered some conceptual problems and research needs. He placed emphasis on the need to specify all the assumptions made and suggested sensitivity analysis of varying assumptions to demonstrate how great the variations might be. He also stressed that, at present, one difficulty was the lack of understanding of the dynamics of manpower supply and demand. Vaizey (1964) and Barkin (1967) also illustrated some of the problems and research needs relative to manpower.

Improvements in methodology cannot come about without a greater number of highly qualified manpower researchers. Rosen (1967) also suggested that this should be a continuing process. There is a growing concern about the quantitative foundation upon which the researcher must base his work. Morton (1966) recognized that federal statistical data did in fact constitute a national resource and that the need for improvement was great, both in improving existing statistics and collecting new data. He also recommended the formation of a data bank so that data could be easily and quickly obtained and made fully comparable.

There are, however, two schools of thought on the question of occupational data for educational planning (March, 1966). One group maintained that the need for occupational data was urgent, while the other group denied that increased data would improve educational planning. The latter held that the methodological weaknesses and difficulty in obtaining accurate data would result in misleading projections. But Swerdloff (1966) said that the question of whether manpower projections should be made is not debatable. The real question, he indicated, was rather how to make them more useful.

Recent Manpower Surveys

Many projections have been made over the last few years of both the available labor force and the requirements of industry. Some of these are of no direct relevance for educational planning, except as a basis for either further projections or further breakdowns. The purpose of this section is to show how all the projections, although they differ, fit together to give a complete picture. This review of actual projections will be divided in the same way as the previous section, where the problems of data were divided into data for labor force projections and data for manpower requirements. It should be recalled that educational planning is undertaken on the federal, the state, or the community level, and that each level would benefit from a manpower projection.

Noted in the previous section were the conceptual problems of projecting "requirements" or "availables" and "unconditional forecasts" or "conditional forecasts." Hansen (1965) indicated the varying types of projections and emphasized the need for a clear statement of the underlying assumptions. He then examined the major producer of statistics to determine their category. It appeared that in all cases the Bureau of Labor Statistics projects actuals rather than requirements, despite the use of the "requirements" terminology, for industry and occupations projections. In the case of total labor force projections, there is little question but that actuals are projected, for nowhere are requirements referred to.

Manpower Requirements

The U.S. Department of Labor (1966a) published details of industrial and occupational manpower requirements. The unemployment rate was assumed to be 3 percent, and the basic patterns which had developed in the postwar period were assumed to continue. As a percent of the total, employment in agriculture was expected to decline further and employment in government and services was expected to increase sharply. Different methods of analysis were used for individual occupations and industries because not only did different factors affect each, but also differences existed in the amount and quality of available data. However, in addition to the detailed and comprehensive analysis, a more global type of analysis for industries was used to check the individual projections and to provide an overall framework.

The occupational projections show only net changes in manpower requirements; there are no estimates of replacement needs. Thus, for education and training purposes, demand will be greater than that shown in the study. The major finding of the study was that although occupational demand will change substantially, the overall demand for less skilled workers will not decrease by 1975, although it will decrease somewhat as a percentage of the total.

Goldstein (1963) evaluated, in light of the 1960 census, results of occupational trend projections made in 1949. The results had appeared in the *Occupational Outlook Handbook,* which was designed as an early warning system to forecast the effect of technology and other economic changes on employment. Although the projections were not expressed in purely quantitative terms and all had a conservative bias, 75 out of 108 projections were reasonably accurate.

Many other projections have been made, often using the Bureau of Labor Statistics' figures as a base, but usually confined either to one state or to one specific industry or occupation. Colm and Lecht (1964) examined requirements for scientific and engineering manpower in order to achieve national goals in the 1970's, and estimated future supply, based on the capacity of educational institutions. They emphasized the range of alternatives affecting total demand and supply of engineers and scientists. Salt (1966) confined his analysis to skilled workers.

Labor Force Projections

The latest labor force projections are to 1970-80 and are summarized by Cooper and Johnston (1965). The coverage is restricted to the national level. Details are given of participation rates by age and sex, and assumptions, representing the authors' best judgment, are made about their future development. The responsiveness of the labor force to economic activity was also examined and correcting adjustments were made. The implications of the projections, which show an increase of 24 million workers in 16 years, are that 1.5 million jobs will be needed per year merely to absorb the growth in labor force. It must be stressed, however, that these are long-term projections and they cannot be used as precise measures against which to judge the adequacy of actual labor force growth from year to year.

Johnston and Methee (1966) showed, consistent with the projections of the nation's total labor force, variations by geographical location. The West is expected to show the greatest increase (36 percent) through the present decade, decreasing slightly up to 1980. Details were given by individual states. All results were presented in terms of percentage increases which, if absolute increases were the same, would necessarily show the smaller states to be increasing faster. This is slightly misleading, but could easily be clarified by the addition of absolute increases.

The inputs into the projections were (a) state labor force participation rates, (b) national labor force participation rates and projections, and (c) projected state resident population. One qualification should be made about the latter. Alternative assumptions could be made in regard to interstate migration of population which would result in a considerably different set of population projections and would, therefore, yield different labor force projections.

A further set of projections was made by Cooper and Johnston (1966). These data were differentiated by race. Such projections, along with those differentiating by sex, age, or marital status, allow for greater accuracy when projecting for a small area which is likely to differ from the overall national trend. They showed that, between 1965 and 1980, the relative increase in the number of nonwhite workers is expected to be much greater than that of the white labor force. But a word of caution was added. It is not easy to estimate the effect of recent civil rights legislation on future labor force activity of nonwhite men and women. Moreover, a breakdown by race of past trends was not available in a suitable form.

Harms (1966) described a study undertaken to determine the supply of human resources and the demand for manpower at the county level. Gaps had to be filled, however, before projections could be considered; resident labor force estimates are not available for any area less than the nation, except at census dates, and for many counties, consistent series of manpower data are not available. Various sources provided the means of interpolating the labor force characteristics defined for the study for the noncensus years 1940-63. Finally, the labor force and employment were projected in quinquennial intervals up to 1980.

Labor force figures by themselves are not of great use to the educational planner. It is only when the data are considered in connection with the requirements for labor and broken down by occupation that estimates of training need can be obtained.

Education and Training Needs

Finally, all the projections are compared to determine education and training needs. Requirements for a specific occupation are compared with the resources available for training additional workers. Stambler (1965) projected manpower needs in 1975 by industry and occupation as a guide in planning training programs. Of equal importance to growth in net requirements is the demand for new workers created by replacement needs, for the latter may well exceed the former. He indicated that the overall effect would be a continued rise in the demand for workers with high levels of education and skill, and a narrowing of employment opportunities for the unskilled. Yet at the same time, because of the tremendous increase in college enrollment anticipated, the supply of college and high school graduates may be adequate to meet the demand.

Scoville (1966) tried to obtain education and training requirements on an occupational basis and to relate this information to the mobility characteristics of occupations. If estimates can be obtained of the amounts of various types of training required to fill certain jobs, then projections of changing occupational patterns will yield predictions for requirements of the educational and training system. Many of the employment services examine their local employment data and project it in the light of national trends, modifying the results by their own detailed local knowledge. For example, the Arizona State Employment Service (1967) reported on manpower directions up to 1975, and had a separate section on manpower shortages and training needs.

A further example of a study determining training needs is that by the U.S. Department of Labor (1966b) analyzing technician manpower. The preliminary requirement was to make a precise definition of *technician*. Total demand for new technicians, including replacement demand, was projected at 1 million for 1963-75. After accounting for all the existing training programs, supply will still fall short of demand by 400,000, and the difference will be made up by upgrading workers from related jobs. The two major implications of this study are, first, that the major source of new technicians will be graduates of postsecondary training programs, and second, that there is an urgent need for continued expansion of technician training facilities.

Conclusion

It is possible to estimate training and educational requirements in order to meet the occupational demands of the economy, permitting growth of the economy with the minimum disturbance from labor shortage and the maximum efficiency from resource allocation. However, manpower projections are far from perfect; methods are crude at present, unforeseen technical changes occur, and the data are often inadequate. Hansen (1965) stressed that manpower policy could best be determined not by more projections but by learning more about (a) how labor markets operate, (b) the nature of the forces shaping the demand for and supply of labor, and (c) the kinds and dimensions of the equilibrating forces which are at work.

This chapter began with the developments in manpower policy as reflected by recent legislation and pointed out that progress in policy had run ahead of progress in research. It was suggested that the causes of unemployment are a combination of structural deficiences and a lack of aggregate demand. It is the former which are more relevant to vocational education. Basic differences of opinion about the functioning of the labor market were presented in the section on the theory of the supply of and the demand for manpower. Further indications of the lack of knowledge and the lack of the necessary tools for manpower analysis were given in the last two sections which dealt specifically with manpower projections.

This raises the question of how useful manpower projections are for the planning of vocational education in the form of a narrow specific type of training for a certain type of skill. Very detailed and accurate knowledge of the labor market is necessary, which is almost impossible in a market economy determined by many unpredictable variables. Furthermore, national projections are of limited use to the vocational educator, who is primarily concerned with the local area, yet local area statistics are not widely available. Nevertheless, manpower analysis can indicate the broad magnitudes of change within occupational clusters. Blaug, Peston, and Ziderman (1967) showed that people in the same occupation can often have different educational backgrounds and experience, and that no one education-experience requirement stands out as obviously appropriate for each occupation. Thus, it is more realistic to plan and train for occupational clusters than for specific occupations. Hopefully, this will also allow greater flexibility and smoother adjustments of supply in response to changes in demand.

There are other aspects to be considered besides the economic. As explained at the beginning of this chapter, education can be considered both as an investment and as a consumption good. So far only the former has been considered because of its relationship to manpower projections, but the latter is equally important. Education has an intrinsic value which not only enables people to utilize their leisure more fully but also helps them to understand what is required of them as citizens. This is a further argument for a wider educational background.

Manpower analysis needs to be recognized as a tool for educational planning, and further research is necessary to improve this tool. At the same time, a forecast can seldom be more than a very sophisticated and knowledgeable guess about the future, and so should be treated only as an approximate guideline. Finally, manpower projections and analysis are concerned only with the economic effects of education; the social and other effects should also be considered.

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CHAPTER III

Career Development

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Work as a prominent feature of the lives of adults has long attracted the interest of social and behavioral scientists. A perusal of contemporary literature bears witness to the growing awareness that occupational motives and behaviors are the result of a complex process of development and experience. Vocational or career development as an area of investigation has been concerned with trying to understand the elaborate socialization process required to transform the child into the working adult, as well as to discover the manner in which work is related to the life styles of adults in the labor force.

Distinguishable characteristics of vocational development, including research reportedly under way which marks this field as a viable one for study, were to be found in Borow's volume entitled *Man in a World at Work* (1964), a compilation sponsored by the National Vocational Guidance Association. Holland (1964) provided a carefully documented review of systematic programs of research which approach career development from a psychological orientation. The newer trends in theory and research may be viewed in perspective by consulting Williamson's historical treatise (1965). Walz (1963) and Perrone (1966) have reported in the *Review of Educational Research* the status of research activity in this field of inquiry since 1962. Borow (1966) summarized research directly concerned with vocationally relevant phenomena in children and youth. The significance of research in career development and vocational guidance was recognized through financial support given by the U.S. Office of Education during the past three years (Scates and Brittain, 1967).

Theory Construction and Testing

Vocational psychology during the decade of the 1950's, partly in reaction to criticisms of classical trait-measurement approaches to occupational behavior and partly because of greater sophistication with respect to human development, gave explicit attention to theory building. Concerted efforts were made to construct heuristic concepts and propositions of a dynamic nature which would serve to explain the process by which vocationally relevant behavior is developed and expressed. More recently, the literature has revealed an increasing interest in empirical research designed to test the earlier speculations and assumptions and to refine and give systematic structure to theory. Although these newer approaches to the study of career behavior promise to bring vocational development into the mainstream of behavioral science, it cannot be assumed that in the immediate future there will be any diminution in number of studies which investigate differential choice behavior by utilizing classical trait theory of personality. Cooley (1964) made the point that the trait-and-factor problem today is not simply the task of relating a test score to some final occupation, but rather a consideration of the pattern of attributes that are related to the sequence of decisions a young person makes in establishing himself in the work world. The use of computers and multivariate methods of prediction should encourage those researchers who desire to probe the limits and capabilities of classical trait theory.

Theoretical Formulations

Important precursors and continuing stimulants to the developmental emphasis in research on vocational behavior have been the 20-year longitudinal Career Pattern Study under the direction of Super, and the Harvard Studies in Career Development directed by Tiedeman. Super and his colleagues have drawn upon self-concept theory to provide testable hypotheses regarding the exploratory and decision-making process. Many of their earlier formulations integrating aspects of theory with elements of vocational behavior were summarized in one work (Super and others, 1963). The fourth in a series of monographs (Super and others, 1967) treated the years of transition from school to college and to work. Approximately 200 men in their mid-twenties who had first been studied 10 years earlier were followed up with interviews. An objective was to determine the extent to which floundering and trial precede establishment in an occupation, and the relationship between such career behavior and antecedent measures designed to assess vocational maturity and traditional personality and achievement variables.

The process of fashioning a vocational identity was seen by Tiedeman and O'Hara (1963) to involve cognitive mechanisms of differentiation and integration which are set into motion through recognition of a problem or present unsatisfactory situation. Their conceptualization of an anticipatory stage of vocational development with substages of exploration, crystallization, choice, and clarification was verified by Harren (1966) with male college students.

Theory underlying current programmatic and longitudinal research assumes that long-term vocational behaviors occur within an ordered sequence of life stages in which there is a progression of necessary learning experiences and a mastery of coping techniques. The notion of invoking the concept of developmental tasks and relating such tasks to vocational life stages holds promise of increasing our understanding of the motives and behavior which have relevance for career. Havighurst (1964), adding to the work of others, proposed a six-stage schema of vocational development, specifying ages and principal tasks or behaviors corresponding to each stage. Havighurst's conceptualization, while helpful, lacks the specificity needed in identifying representative vocational developmental tasks.

Gribbons and Lohnes (1966a) launched a longitudinal study in 1958 designed to investigate the vocational behavior of 111 adolescent subjects as they progressed through a sequence of developmental stages. Projecting follow-ups to the age of 30 years, the investigators adopted the strategy of intensive interviewing every two years. A multidimensional scaling of early vocational maturity resulted in an instrument named Readiness for Vocational Planning.

Programmatic research on career-oriented behavior now under way at the University of Iowa was described by Crites (1965b). The Vocational Development Project has utilized an empirical-analytical approach in theorizing about vocational maturity and the interrelationships among various components of this construct. Through extensive cross-sectional sampling, Crites (1965a) managed to develop and standardize readily employable instruments for measuring aspects of vocational behavior.

Although differences in orientation among theorists may be more apparent than real, certain occupational psychologists have been less concerned with portraying the experiences that shape vocational patterns at various developmental stages than with studying the specific act of occupational selection as an expression of personality. Bordin, Nachmann, and Segal (1963), for example, articulated a framework based upon analytic theory which attempts to identify the gratifications different kinds of work can offer. They traced these gratifications to physiological functions presumed necessary to their achievement, with emphasis upon early experiences leading to particular modes of obtaining gratification.

Roe's formulation, suggesting that basic parental attitudes of acceptance, concentration, and avoidance influence the child's later vocational choice, has stimulated lively research interest. Utton (1962) and Switzer and others (1962) found no clear confirming evidence that early parental management of the child is related to vocational behavior; however, the adequacy of the test in both studies may be questioned because of methodological problems centering around the means used to have college students recall their backgrounds. In contrast, closely related propositions about field of choice deduced from psychoanalytic theory were supported in one study using retrospective interview data (Galinsky, 1962). Efforts to construct more sensitive measures for obtaining data on family-child relations were reported by Roe and Siegelman (1963) and by Brunkan and Crites (1964). Green and Parker (1965) used the Roe and Siegelman instrument to obtain data on parent-child relations from 355 seventh graders. When these data were related to occupational choices, classified according to a person or nonperson orientation, equivocal results were found. There was some evidence that parent attitudes may affect boys and girls differently. Brunkan (1965) reaffirmed the findings of others who have put Roe's hypotheses to test, but his study holds implications for future research. By manipulating the choice variable, Brunkan sought to control conscious or reality factors which may mask the influence of parental attitudes in occupational selection. Future researchers should recognize that the relationship between early childhood experience and vocational choice may have been overly simplified by Roe, and that her theory does not give sufficient attention to the many possible factors which interact and affect career decisions.

A stream of research has been generated by Holland's model of vocational choice behavior, a model which he regards also as a theory of personality. The model includes a six-category typology of psychosocial environments. Predictions can be made that individuals will choose occupations that are in categories consistent with their personality types. The theory, and most of the empirical studies exploring it, were reported in a book by Holland (1966). A major limitation of the research, acknowledged by Holland, is that it was conducted with atypical samples consisting of National Merit Scholars. A study by Osipow, Ashby, and Wall (1966) used a normal sample of college students, and the data revealed that although large proportions of the subjects chose occupations consistent with the theory, many did not. Methodological limitations in assigning students to personality type groups may have led to an underestimation of the predictive value of the theory. Holland's contention that modal orientations may be inferred from typical vocational interest inventories was confirmed in one study which compared *Strong Vocational Interest Blank* scores with vocational choices classified according to one of the six major personality categories (Wall, Osipow, and Ashby, 1967).

Phrased in the tradition of trait-and-factor theory, Project Talent was designed to delineate a system of personality measures from follow-ups with a large, representative sample of high school students, with predictive validity for career and life adjustment criteria (Flanagan and others, 1962). Findings from the first follow-up studies undertaken when each grade was one year out of high school were reported recently by Flanagan and Cooley (1966). In addition to providing normative data with respect to post-high school experiences, the investigators reported information establishing the predictive usefulness of the "Talent" battery with ninth graders. Five-year, 10-year, and 20-year studies are planned.

Critique of Theories

Tempered criticisms of vocational development formulations were found in the literature, pointing to the incompleteness of current theory. Tyler (1967) stated that much of what is being discovered about the stages through which an individual passes in preparing to find his place in the work world cannot be generalized beyond middle-class males. LoCascio

(1967) showed how theories of vocational development tend to emphasize the continuous, uninterrupted, and progressive aspects of behavior, and thus appear to have limited significance for the disadvantaged, whose development probably is characterized best as discontinuous. Noting the strict adherence of the theorists to taxonomies based on positive attitudes toward work, Zytowski (1965) proposed that avoidance behavior be studied. Lyon (1965) underscored the need for occupational researchers to relate theory to cultural determinants rather than to conceptualize exclusively in terms of a universally applicable developmental psychology. Accepting the developmental approach, Beilin (1963), however, cautioned that there is danger in focusing on normative data and conceptions to the neglect of studying cognitive learning. An overall analysis was made by Carkhuff, Alexik, and Anderson (1967), who applied an inductive-deductive schema of theory building to contemporary vocational development formulations. These analysts concluded that none of the present theories satisfies the criteria of a comprehensive model, and they offered the opinion that theoretical breakthroughs may be held back by the need of researchers to continually relate their data to preconceived constructs which do not change with the acquisition of data.

It is encouraging to note from this review that psychologists are beginning to champion sound conceptual models of vocational behavior and are evidencing a lively interest and involvement in putting theoretical propositions to test. That much of the present knowledge provided by research may not permit generalization to large segments of the population, particularly to women and to those who live in marginal socioeconomic circumstances, constitutes a theoretical and practical problem of considerable importance.

Additional References: LoCascio (1964); Super (1964).

Correlates of Vocational Development

Many studies have been directed toward examining the processes by which concepts of work are acquired and vocational motives expressed.

Occupational Stereotypes

Research has consistently shown that there is high agreement in perceptions of occupations when a prestige dimension is imposed by the investigator. Hodge, Siegal, and Rossi (1964) compared prestige rankings of occupations with similar rankings obtained in 1947 in a widely cited study by North and Hatt of the National Opinion Research Center. A coefficient of correlation of 0.99 resulted. Gunn (1964) interviewed elementary children to determine when and in what manner the prestige motive is manifested. She found that children as early as the third grade were beginning to confer status to jobs based upon service criteria, while at the seventh-grade level a social class hierarchy had emerged in their perceptions. Socioeconomic differences in values were associated with disparities in ranks assigned by senior high school subjects.

Where psychological dimensions of vocational stereotypes have been studied, results are conflicting. Bohn (1966) investigated the relationship between psychological needs and measured vocational interests, interpreting the findings as supporting current vocational stereotypes. Gonyea (1963), on the other hand, permitted subjects greater freedom in choosing relevant dimensions and found a heterogeneity of vocational perceptions not indicated by previous research. That a person's image of his chosen occupational role may change was shown by James (1965), who found that discrepancies between perceived self-expectations and concepts of persons in the chosen occupation motivate attitude change leading toward congruity.

Educational and Occupational Aspirations

A review by Haller and Miller (1963) showed level of occupational aspiration to be an important variable in the study of social mobility behavior of youth. In a seven-year follow-up of high school junior and senior boys, Miller and Haller (1964) found a crude measure of level of aspiration to be the best predictor among 50-odd variables of the prestige accorded to the occupation in which the individual was eventually employed. To meet the need for an adequate research instrument to measure the variable, Haller and Miller (1963) constructed the Occupational Aspiration Scale. The instrument appears to offer a practical and reliable measure for determining differential levels of occupational aspiration; however, predictive validity of the instrument, its fakeability, and its appropriateness for girls remain open questions.

The variety of social stimulus variables found to be associated with level of aspiration and the lack of attention, in some instances, to proper control, make it difficult for those who wish to draw dependable inferences. Krauss (1964) discovered that educational aspirations of lower-class youth were related to the educational experiences of family members and peers. The effect of perceived economic opportunity on aspirations was apparent in a study by Henderson (1966). He found that poverty-stricken youth, when compared with middle-class Negroes, projected a significantly greater difference in ideal and real aspirations. Appalachian youth who stay in that geographical area were studied by Stevic and Uhlig (1967) and were found to have significantly lower occupational aspirations than those who migrate to a residential area near an urban center. Sewell and Orenstein (1965) tested the relationship between size of community residence and occupational choice of youth. Controlled factors of intelligence and socioeconomic status failed to account for the lower aspirations of male youth from rural and smaller communities. Career patterns reflecting aspiration levels of rural youth were studied by Nelson and McFarland (1962). Among rural male graduates of 70 high schools in Minnesota who were followed up six years later, less than one-third sought formal post-high school training and less than 50 percent of those in the upper half of their graduating classes continued in school. Few of those who did go on chose to enter trade or technical schools. These studies seem to suggest that the level of one's aspirations is contingent to a degree upon opportunities and experiences available within one's frame of social reference.

Psychological characteristics and personal orientations tending to produce the experience of success in occupationally related areas of behavior were found to be associated with levels of aspiration. Gribbons and Lohnes (1966b), reporting findings of longitudinal research over a five-year period, disclosed that adolescents with intelligence slightly above average tended to lower the level of their aspirations, whereas over half the youngsters classified as having IQs below 105 persisted in their preferences for the professions. Perrone (1964-65) found that students whose aspirations led them to enroll in two-year post-high school programs were intellectually, socioeconomically, and educationally between those who terminated their education at high school or before and those who attended four-year colleges or universities. Motivational elements common to academic achievement were found by Farquhar and Payne (1963) to function similarly in occupational aspirations. The effects of fear of failure in organization of occupational aspirations were studied by Burnstein (1963). As fear of failure increased, prestige of occupations aspired to decreased.

Career Decision-Making Behavior

The literature was replete with investigations of the career process from initial attraction to a field of work through subsequent modifications of vocational choice to job entry. Parker (1962) sampled 29,000 seventh graders in Oklahoma and found the majority, 67 percent of the boys and 66 percent of the girls, expressing a certain definiteness about their future. In a 12-year longitudinal study of the vocational choices of children, Tyler (1964) concluded that boys who prefer a career in science crystallize their interests between the ages of 10 and 14. The interests of career-oriented girls begin to take shape at or before the age of 14.

As suggested by the theory of career patterning, a discernible change in factors associated with decision making at different ages was noted. O'Hara (1962), in a study of fourth-, fifth-, and sixth-grade pupils, confirmed the hypothesis that choices made at this stage of development are more closely related to interests than capacities. Following eighth graders over a two-year period, Gribbons (1964) found increasing awareness of interests and values and their relation to occupational decisions, along with greater awareness and accuracy of appraisal of abilities. He noted, however, that many youngsters at the tenth-grade level were not yet ready to make educational and prevocational decisions. Contrary to theoretical suppositions that values do not assume an important role in the vocational development of early adolescence, Gribbons and Lohnes (1965) concluded that value statements even among eighth graders are relatively free of fantasy elements, and remain constant throughout high school.

Evidence of a continued preeminence of the interest factor in vocational decision making of adolescents was found in several studies. Mierzwa (1963) selected science and nonscience criterion groups of eleventh-grade students and related multisystems of data to persistence of career choice. The effectiveness of the interest system to discriminate science and nonscience groups remained constant over a two-year period, although ability and environmental systems were shown to increase in effectiveness. Madaus and O'Hara (1967) found differences in the multivariate vocational interest patterns of high school boys classified according to nine broad categories based upon stated occupational choice. The study showed that these differences were more specific than science-nonscience differences found in previous research. Career choices of 650 male high school seniors were assessed by Astin (1967a) on the basis of their personal characteristics when they were in ninth grade. Among the 26 antecedent variables studied, measured interests and expressed career choice at the ninth-grade level were the best predictors of career outcomes at the twelfth grade.

Although criteria for evaluating realism of vocational choice have been found wanting (Hewer, 1966), it seems logical that decisions based on reality factors should lead to greater realism with advancing age. Defining realism in terms of level of vocational choice, Hollender (1967) showed that the concept was related to both age and grade. The shift with age from a reliance primarily upon interests in vocational decision making was noted by Montesano and Geist (1964), who, in contrasting ninth- and twelfth-grade boys, found the older students taking into account more factors related to their abilities and to occupational requirements and conditions of work. Hall (1963) observed that high school seniors compared with sophomores and juniors more frequently described themselves as being able to make a choice and to base their choices upon realistic factors in work. Decision making was viewed by Dilley (1965) as a function of vocational maturity, and he found the ability in twelfth-grade students to be associated with intelligence, achievement, and participation in extracurricular activities.

Vocational decision making was conceptualized by Hershenson and Roth (1966) as a process in which (a) the range of possibilities is narrowed and (b) those remaining are strengthened. According to Gross (1967), the direction of choice is less a matter of moving *toward* a solution of a problem than it is a moving *away* from a situation that is undesirable. Borow (1966) accented this line of thinking by stating that vocational decision making appears to be marked by a kind of occupational foreclosure in which many fields of work may be eliminated prematurely. Empirical support for the view was provided in Nelson's (1963) study of the knowledge and interest of elementary and secondary school students toward 16 selected occupations. Whereas the younger children, and those of lower IQ and socioeconomic status, tended to respond positively to all occupations, the responses of older and brighter youngsters were more pointedly negative. Nelson concluded that the occupational elimination process starts early in the elementary grades.

Implicit in a number of theories is the assumption that personality characteristics differentiate individuals preferring various fields of work. Crites (1963) found type of motivation to be a factor of importance in interest development. The primary motivational characteristic differentiating interests was a bipolar one of social service versus outdoor, science, and technology (working with people rather than things). In research on origins of interests in children, Roe and Siegelman (1964) obtained statistically significant correlations, though generally of a low order, between measures of early experience and adult preference for social activities. Oppenheimer (1966) confirmed the findings of a number of studies which have shown that people prefer occupations perceived as congruent with their self-concepts. A mediating variable, labeled self-esteem, was found to be related to eventual occupational choice in two studies (Korman, 1966, 1967). Kinnane and Gaubinger (1963) sought to determine with college freshmen the relation of general life values to values held important in work. The resulting correlations were significant, but low. One may conclude that descriptive and response correlated studies attempting to shed light on the interactions of personal traits and pre-employment occupational behavior have not, to the present time, provided convincing evidence in support of the predicted relationships.

Patterns of vocational change over time are of particular interest to those concerned with vocational education and manpower training. Super (1967) employed a variety of scales and judgment-making procedures to assess the vocational progress of young men from ages 18 to 25. Throughout these post-high school years, approximately one-third of the subjects engaged in behavior adjudged to be floundering. At age 25, one-fifth of the men still had not developed stabilizing vocational coping behavior. Of secondary interest, less than two-fifths of the subjects actually entered one of the occupations specified while in high school, a finding in line with the results of other research. Studies of career change among students in vocational-technical schools were not found, but Nichols (1964) investigated shifts in vocational choice of more than 6,000 highly able men and women during four years of college. Significant net changes occurred in all major fields except biology and speech. Astin (1967b) analyzed career change in samples of subjects of varying levels of educational attainment and found a consistent shift away from science and engineering fields and toward careers in business and education.

Interpretation of the data from research on career decision-making behavior raises serious questions about the wisdom of imposing vocational directions or curriculum choices on adolescents while in high school. Although the data testify to a healthy maturation of vocational motives and behavior during the adolescent years, including an increasing awareness of reality factors affecting vocational choice, the number of students making decisions based upon irrelevant and inaccurate information and the pattern of choice change during the early adult years argue for flexibility in educational programing. What effect specialized vocational training has in stabilizing career aspirations remains a question for investigation.

Sources of Influence

Multiple factors have a bearing on the development of work-relevant behavior. Unfortunately, the attention given to studying personal variables involved in vocational decision making has not been matched by an equal concern for understanding the influence of significant reference groups or the effect of providing information about job requirements and employment opportunities.

From the inception of the vocational development process, the family constitutes a highly significant reference group. Elder (1963) showed how family childrearing practices foster the development of achievement potential. Kinnane and Pable (1962) verified a number of hypotheses regarding the relationship between work values and family background dimensions, including cultural stimulation, family cohesiveness, social mobility, and adolescent independence. Evidence of the importance of the father's influence on vocational development was provided in a study by Marr (1965). Subjects who, at the age of 25, indicated a commitment to a field were contrasted with those who did not. A higher proportion of those having made a choice were found to have a father or father substitute whom they accepted. Steimel and Suziedelis (1963) found that predominance of perceived influence by one parent over that of the other had a demonstrable effect on the direction of interest development. Subjects reporting father influence measured more typically masculine interests. The investigators suggested that parental occupational and educational level may account for the perceived predominance of influence. Parental influence on work values of women was studied by Kinnane and Bannon (1964). The predominance of perceived influence by a father whose level of education and training was superior to that of the mother appeared to result in a lower work-value orientation on the part of the daughter.

Stump, Jordan, and Friesen (1967) cited a need for research to explicate the effect of cultural contexts on vocational development. Smelser (1963) analyzed socioeconomic histories of 93 families over an extended period of time and concluded that sons from the upward mobile families were the most aspiring as adolescents and the most dominant in their adult self-appraisals. In a study of sixth-grade boys in the Boston area, Maccoby (1962) found modest support for the hypothesis that middle-class children, in contrast to those from lower working classes, prefer occupations which offer authority and responsibility roles.

The impact of social and cultural restrictions on the occupational socialization process was the focus of several studies. Chansky (1965), matching 100 Negro and 100 Caucasian ninth-grade students on aptitude, found significant differences in the vocational interests of the two races. Negro youth were more interested in occupations calling for social interaction, money exchanges, verbal fluency, and computational manipulations. Caucasians were inclined to occupations involving a concern with nature and machines. Comparing children in grades three through six from the inner city with a representative group from suburbia, Clark (1967) reported that middle-class boys and lower-class girls express a significantly greater preference for white collar and professional occupations. In their perceptions of occupations, both lower-class boys and girls were significantly less able to supply appropriate job titles to stimulus figures, suggesting that some job models lack relevance for young people who are economically deprived. Himes (1964) drew the conclusion that race and class establish institutionalized conditions under which lower class Negro youth are socialized to certain work-related cultural deprivations which influence both their acceptance and performance as workers.

Other influences were singled out as being instrumental in the formation of work-related attitudes and values. From their study of 1,105 working males aged 25 to 64, Duncan and Hodge (1963) concluded that formal education is becoming a more potent factor than father's occupation in the son's level of occupational achievement. The potential influence of the counselor as a molder of attitudes was shown in a study by Krumboltz and Varenhorst (1965). Ninth-grade pupils were asked to indicate the extent of their agreement with three statements, each of which was attributed to a different one of three communicator groups: parents, peers, and counselors. Although the study was not designed to test influences specific to vocational behavior, the results clearly indicated the power of the counselor to shape attitudes.

De Fleur (1963) found that children between ages 6 and 13 increase their knowledge of occupational roles and status and that personal contact is a more effective educational influence than either television programs or general culture. Tennyson and Monnens (1963-64), on the assumption that elementary reading texts may influence vocational aspirations, analyzed the reading series of six publishing companies. They found a disproportionate emphasis given to professional, service, and outdoor occupations and an equivalent lack of attention given to clerical, skilled, semiskilled, and unskilled occupations. The influence of occupational information on vocational attitudes was demonstrated in a study by Osipow (1962), in which descriptive information eliminated differences in perception that apparently existed as a result of presentation of job titles alone. Few studies were found which dealt with the influence of school subjects, work experience, or peer pressure upon the development and expression of vocational motives.

Occupational Status and Performance

Prediction of Vocational Success

The efficacy of psychological measures to predict career performance continued as a pragmatic question of interest to researchers. An extensive survey of the literature by Super and Crites (1962) provided data on the usefulness of tests in predicting training and job success. The findings, which were generally consistent with earlier summaries, indicated a gap between training and job performance. Thorndike (1963) suggested that prediction of performance in school and work training programs may be the most one can expect from our present test batteries. When the task is viewed as that of providing individual guidance, the researcher may find logic in the approach of Cooley (1964), who made short-term predictions of educational and career decisions at successive stages of development.

Crawford (1964) reported the use of a variety of aptitude test batteries designed to predict successful performance in some 55 different curriculums at Los Angeles Trade-Technical College. Counselors in Georgia were provided data by Bottoms (1965) which enabled them to use the *Dailey Vocational Test* in relating student abilities to performance in area vocational-technical school programs. Banas and Nash (1966) correlated scores on selected scales of the *General Aptitude Test Battery* with a composite criterion to test the hypothesis that work performance of nonhandicapped subgroups of skilled, clerical, and nonskilled was more predictable than that of handicapped subgroups. Results showed a pattern of consistently lower validities for the handicapped, suggesting that aptitude measures typically used in selection may not be appropriate for persons with physical disabilities.

Although no studies were found which predicted success within an occupation from a measure of interest, evidence of the value of such inventories for predicting occupational choice or differentiating occupational groups continued to mount. D. P. Campbell (1966a,b) marshalled substantial data to show that scales of the *Strong Vocational Interest Blank*, developed in the 1930's, hold up in current cross-validations. Clark (1961), employing the *Minnesota Vocational Interest Inventory*, demonstrated that differentiated interest patterns exist among men who work at skilled and semiskilled occupations.

The prediction task in vocational education may be confounded by a philosophical disagreement over whether tests are to be used to predict individual career behavior or to make decisions regarding large numbers of candidates for various programs. Borow (1966) has shown that the conditions which apply in predicting normative behavior for personnel selection do not ordinarily obtain in vocational counseling, where one person's characteristics must be statistically related to a large number of occupational performance sets.

Personality Differences Among Occupational Groups

Only a few studies were reported in which the principal focus was on occupational group differences. The problem of relating personality attributes and roles of workers in various occupations is a formidable one, not only because of the tolerance within any given occupation for satisfying widely varying needs, but also because variables of age, education, and socioeconomic background interact to affect either personality or occupational role.

Segal and Szabo (1964), deriving hypotheses from psychoanalytic theory, found that accounting students contrasted with creative writing students exhibited closer positive identification with their parents and expressed more accepting attitudes toward authority and people in general. Personality characteristics of male and female junior college students enrolled in trade and vocational courses were analyzed by Stewart (1966). Noncognitive variables explored included sources of life satisfaction, risk-taking attitudes, impulse expression, estheticism, and abstraction. The population was found to be psychologically different from junior college students who are in nonvocational programs and from student populations in four-year colleges and universities. Gray (1963) was able to draw personality descriptions for secondary teachers, accountants, and mechanical engineers based upon differences found with the *Edwards Personal Preference Schedule* and a values inventory. Controlling age and experience factors, Gunderson and Nelson (1966) assessed differences among several Navy occupational groups on 31 personality and value scales. Most of the variance in test scores was accounted for by dichotomizing the six occupational specialties into the two broad categories of "white collar" (administrative and technical) and "blue collar" (mechanical, electrical, construction, and cooks). The latter group indicated greater needs for support, conformity, and rigidity in social relationships. Three occupational groups, classified on a person-thing–directed continuum, were studied by Miller (1962) and found to differ when personality dimensions were analyzed. The findings suggested that personality variables in relation to work may in some instances be value-oriented and in others function-oriented.

Worker Adjustment

Worker satisfaction, motivation, and productivity are often discussed as factors in vocational adjustment. Robinson, Conners, and Whitacre (1966) reviewed studies of job satisfaction completed in 1964-65, supplementing earlier reviews. Dawis, England, and Lofquist (1964) published a theory of work adjustment in which the interaction between the individual and his work environment is defined in terms of two concepts—"satisfactoriness" and "satisfaction." Weiss and others (1964a,b) reported on the development and construct validity of the Minnesota Importance Questionnaire, a measure of an individual's vocational needs. Five components of satisfaction were analyzed in a study by Carlson and others (1962) with handicapped and nonhandicapped workers possessing varying levels of skill. Among the nonhandicapped blue-collar workers, the "human relations" factor tended to have a larger significance in the satisfactions of the nonskilled than of the skilled. For the white-collar workers, a dominant factor was "satisfaction with the conditions of work," including satisfaction with supervision and compensation. A later publication by Carlson and others (1963) reported criterion measures of the worker's satisfactoriness to his employer.

Kornhauser (1962) found that factory workers performing in occupations in which well developed skills are applied show greater mental health than those limited to repetitive machine-paced operations. Mulvey (1963) was able to relate degree of adjustment to career pattern in a study of women between the ages of 37 and 47. She reported that most well adjusted women had a career pattern midway between housewife and full-time career. Lodahl and Kejner (1965) defined job involvement as a multidimensional attitude that can be scaled with adequate, but not high, reliability. The construct was found to be most affected by organization conditions and learned value orientations. Work role relationships within organizations were analyzed in a national survey by Kahn and others (1964), who found role conflict to have been experienced by about one-half of the workers in their sample. Paloli (1967) investigated the relationship between contrasting organizational types created in the laboratory setting and the distribution of three types of role strains—role uncertainty, role disparity, and role incompatibility. Modest support was found for the hypothesis that role uncertainty and role disparity would be more frequent in a relatively unstructured organization. It was further observed that emphasis on work rules was more directly associated with the frequency of role incompatibility than any other organizational feature.

Fundamental questions about what makes for a satisfied and productive worker remain to be answered. Since most of what is known about attitudes toward work has been learned through study of individuals for whom the ability to work is not a social problem, the current interest in the handicapped worker is a development of practical significance. The influence associates have on worker productivity has been studied extensively, but little is known about how differences in satisfaction with various aspects of one's vocation may result from different reference group pressures. Most importantly, there is need to research the elaborate socialization process required to transform the playing child into the working adult.

Facilitation of Career Development

Difficulties encountered by young people today in comprehending the intricate relationships of occupational life have prompted a growing interest in experimentation with procedures and media by which adequate information may be communicated. Katz (1963) explicated a schema for considering the use of curriculum choices and in-school decisions as part of a systematic program of career guidance. A conceptual model developed by Martin (1967) has provided a base for the design of new types of guidance materials and instructional approaches centering upon career planning for noncollege-bound and culturally disadvantaged youth. Her research has identified several important behavior elements related to vocational development. Drews (1965) demonstrated that a program which offers encouragement, models, and guidelines produces changes in attitude towards learning and towards career among gifted girls. Her materials formed the basis for a new career social studies program which is a radical departure from the usual vocational guidance course. Boocock (1967) reported the results of field tests with the Life Career Game, a simulated environmental tool for teaching decision making. The game was found to be useful in arousing student interest, communicating factual information about career decisions, and providing young people a realistic, if vicarious, experience with certain aspects of adult life. Shirts (1966) adapted the Life Career Game for use with sixth graders. Although the game evoked a high degree of pupil interest, an experimental group which played the game did not make a significant gain in vocational maturity over a control group.

Krumboltz and Thoresen (1964) reported the first in a series of carefully controlled experiments designed to evaluate the success of reinforcement counseling procedures in effecting changes in vocational behavior. Verbal reinforcement of information-seeking responses during the interview resulted in greater exploration of relevant occupational and educational information outside of the counseling situation. Model reinforcement presented through an audio-taped counseling interview proved more effective than verbal reinforcement alone in the case of males. The findings of this study were substantiated in later research by Krumboltz and Schroeder (1965) and by Thoresen and Krumboltz (1967).

Research and operational use of new technologies for processing information comprised the subject matter of a conference summarized by

Campbell and others (1966). A model system providing for microfilm storage, retrieval, and dissemination of occupational information was reported in use in San Diego County (Pierson, Hoover, and Whitfield, 1967). Ellis and Wetherell (1966) described the need for equipment required in a computerized system for presenting career information. A prototype computer-based occupational information system was developed and described by Impellitteri (1967). One unique feature of the system is that information can be selectively presented in accordance with the individual's abilities as measured by the *General Aptitude Test Battery*. Hoyt and Cochran (1965) described a research program designed to collect, analyze, and disseminate data useful in the guidance of persons contemplating attendance at trade, technical, or business schools after leaving the secondary school.

Several national conferences have sought to find ways of stimulating research in career development and improving vocational guidance practice. Suggested guidelines for research and practice relative to guidance in vocational education were presented by R. E. Campbell (1966). Ashcraft and others (1966) identified concepts of occupational behavior and work in a changing society which have relevance for school curriculum planning. McDaniels (1966) compiled background papers and task-oriented group reports presented at a conference on the vocational aspects of counselor education. Many of the suggestions forthcoming from this conference are ready for prompt field tryout.

Summary

A strong beginning has been made to establish firmly or to contradict by empirical means the fundamental assumptions on which theory of vocational development rests. While contemporary formulations and research were found to fall short in important respects, an impressive body of knowledge about vocational development and behavior has accumulated. Concerted efforts are needed to start translating existing theory into practice. The potential of vocational education for providing exploratory experiences that develop broad occupational awareness remains an important topic for which there is need of research.

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CHAPTER IV

Curriculum Development

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Previous reviews of research in vocational, technical, and practical arts education have indicated a continuing interest in curriculum development. The research reported, however, was often limited to status studies. These descriptive efforts reported the needs, problems, and values of local communities, frequently to the exclusion of other sources of useful data. From these findings, curriculum needs were inferred. Further, the studies were seldom based on any consciously developed or recognized theoretical foundation or model. Nevertheless, inadequate as it has been, curriculum development research has had considerable influence in shaping and directing the curriculum in vocational, technical, and practical arts education.

Since 1962 there has been a steadily increasing interest in research related to curriculum development. More attention has been given to the theoretical base of the research being conducted, as well as to the use of rigorous research designs.

Situation, Societal Pressures, Problems

Rapid changes in the world of work due to technological developments, new societal pressures, and recognition of existing problems have motivated research to guide curriculum development. Automation, for example, has had a profound influence on the world of work. While retailing jobs may have been less affected by automation than many other occupational fields, Rose (1963) analyzed its impact on American department store operation. He found that automation in this area was increasing rapidly and that it was affecting the functions of employees, but that these changes were not being reflected in high school and junior college curriculums.

In analyzing socioeconomic trends to aid curriculum planning, Beam (1961) found that local requirements were important and needed to be considered by curriculum developers. The recent nonresearch literature in vocational and technical education, however, has emphasized the importance of regional, national, and international social and economic trends in curriculum development. Research is needed to assess the effects of worker and employer mobility and the relationships between local and nonlocal socioeconomic trends that affect the competencies needed by workers. Vocational education may often be unduly influenced by local needs and trends, but Beam's study indicated that they cannot be ignored completely.

Klein (1964) analyzed the functions of lay advisory councils. Additional research is needed to determine the roles of various groups in deciphering societal needs that have an impact on occupational curriculum development.

The role of various workers in our society is changing rapidly, indicating the need for curriculum revisions. In addition to the increasing proportion of women in the dual role of wage earner and homemaker, there are probably discrete groups of workers, not yet identified, that are assuming dual occupational roles of various types and therefore require a vocational and technical education that prepares them for such dual roles. Additional worker role studies based on several dimensions, such as age, sex, and race, are needed.

Society has recently become concerned about providing vocational education for workers in new and developing occupations as well as for occupations that have not previously been considered a part of the traditional vocational education service areas. Stevens and others (1965) summarized the results of many studies designed to (a) identify present and emerging nonfarm occupations involving plant, animal, and soil science and agricultural mechanics, (b) determine the manpower needs in these occupations, and (c) determine the competencies in agriculture and related fields of study needed by workers in nonfarm occupations. Similar studies for other new or emerging occupations are under way and will aid in the development and revision of vocational and technical curriculums.

Objectives and Philosophical Positions

In recent years increased attention has been given to the development of theories or models for curriculum development in vocational, technical, and practical arts education. Simpson (1966-67) developed a taxonomy of educational objectives for the psychomotor domain. This taxonomy provides a model for identifying curricular objectives involving psychomotor tasks. The taxonomy also permits a more systematic approach in curriculum evaluation studies. The schema for the classification of psychomotor domain objectives, in sequence and order of complexity, includes perception, set, guided response, mechanism, and complex overt response. Yoho (1967) developed a theoretical model for the total functioning society. By a process he called "systems network analysis," he derived content for industrial education. Chaplin (1964) advocated a role theory model as a basis for analyzing the content of subject areas and for determining the general concepts, understandings, attitudes, and skills to be attained. Towers and others (1966) gave impetus to the development of objectives, philosophical positions, and model development in their curriculum research involving the content of industrial arts. The philosophical positions and theoretical models they developed, from which curriculum content was inferred, has already motivated, and should continue to motivate, other research workers to give additional attention to this aspect of curriculum development.

Interest was generated in the relationships among the curriculum requirements for various occupational fields. Carter (1966) studied the relations between business and home economics education and the other subject fields in the public high schools of Indiana. Phipps and others (1964) investigated the activities and knowledge needed by technicians in rural areas. All technologies were studied, including engineering, health, agriculture, business, and home economics. Requirements did differ, depending upon type of technician, but a factor analysis of activities and knowledge requirements revealed information about relationships among the competencies of the various kinds of technicians.

Altman (1966) studied the vocational capabilities that are needed in several jobs and occupational areas. He identified, through a factor analysis of test items on performance tests for several skilled jobs, six curriculum areas in which workers need competence: mechanical, electrical, spatial, chemical and biological, symbolic, and "people."

Dawis, England, and Lofquist (1964) developed a series of hypotheses relating to work adjustment which should prove valuable to curriculum development researchers, especially those concerned with objectives, philosophical positions, and model building.

Curriculum Research Strategies

Research workers formulated different strategies to determine curriculums needed. These strategies reflected attention to (a) the changing situation in the work world, (b) societal pressures, (c) new or increased attention to existing problems, and (d) the philosophical positions or model of curriculum development.

Family of Occupations or "Cluster" Approach

Several studies attempted to determine the occupations that required similar or closely related knowledge and skill. The investigators involved in these studies recognized the importance of preparing workers for a family or cluster of occupations because technological change often eliminates single-skill jobs. A broadly prepared individual with both skills and cognitive background for a family or cluster of occupations is presumed to be better prepared to adjust to subsequent technological developments that affect his occupational field. Maley (1966) conducted a study to define the "cluster concept."

Courtney (1962) compared the knowledge and experience levels required by farmers, grain elevator managers, and farm real estate brokers. Dillon (1965) investigated whether separate and specialized courses were needed for workers in nurseries and ornamental horticulture businesses. Fiscus (1965) studied the kind and depth of knowledge in agriculture needed by workers in farming, in grain elevator businesses, and in agricultural equipment businesses. These studies, using sophisticated research design and analysis techniques, found that there were many common competencies demanded by the occupations studied.

Schill and Arnold (1965) sought to define the common curriculum needs of technicians in the electronic, electrochemical, electromechanical, mechanical, chemical-mechanical, and chemical technology fields. They were able to identify a core of knowledge needed by technicians in all six fields.

Whitmarsh (1966) ascertained the information about child development and guidance used by mothers and by workers in occupations related to child care. She identified a core of knowledge common to both occupations. Roberts (1966) determined the kinds of gainful employment in which certain former homemaking pupils in secondary schools were engaged. He then attempted to identify the core of homemaking knowledge and skills that contributed to competence in those occupations.

Research to identify the families or clusters of occupations and to determine the core knowledge and skills common to each was important and will continue to be important. A good start, but only a start, has been made in this area of curriculum research. Studies are needed to summarize the findings in various occupational fields to determine whether there is a content common to all types and levels of work. Studies are also needed to determine the core content common among families or clusters of occupations that have already been identified.

Transferability Approach

A curriculum development approach which has motivated interest among research workers and which is closely related to the research designed to identify families or clusters of occupations is the transferability approach. Transferability studies have attempted to identify the content needed in vocational, technical, and practical arts curriculums that has a high transfer value for many types and levels of jobs, regardless of whether or not the jobs are in the same cluster or family. Altman (1966) used factor analysis to develop a matrix of six general vocational capability areas and a series of psychological processes that should be useful in identifying vocational, technical, and practical arts content with potential transfer value among various jobs and families of jobs.

Sjogren and Sahl (1966) summarized the research on common job behavior. They classified the research under three headings: (a) job analysis studies, (b) studies of psychomotor factors, and (c) studies of cognitive factors. Their findings may be used to select content that has potentially high transfer value. Roney (1964) analyzed the interrelationships among mathematics, science, and technical subject matter of accredited curriculums in post-high school technical institutions. Barlow and Schill (1962) investigated the essential mathematics content of electrical and electronic technology. Starling (1964) studied the possibility of integrating biological principles with occupational instruction in agriculture as a means of enhancing transfer. He concluded that biological principles could be taught effectively in agricultural occupations courses. Studies such as these, determining the necessary content from such disciplines as mathematics, biology, physics, and chemistry, will provide suggestions regarding the curriculum content with greatest transfer value.

Competency Pattern Approach

Many studies were conducted to determine the pattern of competencies needed in occupational areas. Most of these studies did not cross traditional occupational education fields, but most did involve two or more job titles or two or more clusters of job titles. This is in contrast to the research reported in reviews prior to 1962, when predominant attention was given to the study of competencies for single job titles.

The recent emphasis on extending vocational and technical education to occupational areas not previously served, or inadequately served, motivated many studies. One of the areas that received a great deal of attention was nonfarm jobs requiring knowledge and skills in agricultural subjects. Illustrative of the various studies are the investigations by Albracht (1966), Coupland (1962), Courtney (1962), Dillon (1965), Fiscus (1965), Gardner (1964), Halterman (1964), and Phipps and others (1964). These studies pioneered in occupational education in the development of philosophical positions, data collection procedures, instrumentation, and statistical techniques. They also identified the following nonfarm families or clusters of jobs that require considerable knowledge and skill in agricultural subjects: agricultural supply, agricultural mechanization, agricultural products, agricultural resources, ornamental horticulture, and forestry. The techniques found successful or unsuccessful in these studies should provide guides to curriculum researchers interested in determining the competencies needed in other occupational areas, especially those which are newly emerging.

Functions of Industry Approach

An overall theoretical framework is needed to guide curriculum development for all occupations, regardless of type or level of competencies required. Bateson and Stern (1963) suggested that the functions of industry be used as a framework for ascertaining the education needed by workers. Stern (1964) analyzed the functions of goods-producing industrial establishments and used his findings as a framework for developing a curriculum in industrial education. Other studies are needed to investigate the applicability of this philosophical position to other occupational areas.

Curriculum Guide Approach

A number of curriculum guides outlining suggested vocational and technical content were developed. Most of these guides were prepared under contractual sponsorship of the federal or state governments. They usually relied on the expertise of university or junior college personnel in the discipline fields involved as the means of identifying subject-matter content. This procedure can be justified, but it has some definite limitations. It is questionable when no validation studies are conducted to confirm the wisdom and biases of the "experts." The curriculum guides developed have been used and have motivated the development of new vocational and technical education programs. Studies should be conducted, however, to evaluate the guides and the subject-matter content they contain. Illustrative of the guides developed are those by Binkley (1967) and the U.S. Office of Education (1962; 1964a, b, c, d, e, f).

Designs and Procedures

Traditionally the research designs and procedures involved in the studies related to curriculum development in vocational, technical, and practical arts education have been straightforward, relatively simple, and often unimaginative. Much of the research in recent years may also be characterized in this way, but an increasing number of the more recent studies conducted have imaginative designs and have utilized innovative procedures.

Analyses of variance techniques were used by Courtney (1962), Dillon (1965), and Fiscus (1965) to identify the common and differentiated occupational competencies required in various occupations. The results of these studies seem to indicate that the ANOVA technique accentuates differences, but is inadequate as a means of identifying common competencies.

Fuller (1965) described and illustrated the use of factor analysis and factor scores as a promising technique for grouping occupations requiring common competencies. The use of factor scores for job activities, knowledges, and skills provided information of value in determining curriculums for certain clusters of occupations and for the detailed content of the courses within curriculums. Phipps and others (1964), using factor analysis, identified activity factors and knowledge-area factors around which job titles could be clustered for curriculum purposes. Stevenson (1965) found eight competency factors in off-farm agricultural occupations. Baker (1966) and Hoover, McClay, and Stevens (1966) identified 11 competency factors that could be considered major areas of instruction for courses designed to prepare for employment in a selected occupational field.

Perkins and Byrd (1966) developed a research model, using a validated questionnaire, for the identification of task and knowledge clusters associated with occupational areas. They presented a paradigm for task and knowledge investigations. Rahmlow and others (1966) developed a survey instrument for identifying clusters of knowledge and other competencies associated with performance in food service work. Employees were asked to identify tasks and combinations of tasks they performed. With adaptation, the instrument might be used effectively in other occupational areas.

Albracht (1966) developed and used a process for determining the vocational competencies needed in the performance of essential activities in a sales occupation. He focused on the functions of industry instead of job titles as a basis for developing curriculums. The McQuitty hierarchical classification system was used to determine clusters of competencies needed by workers.

Briggs and Norris (1966) developed techniques for selecting occupational information needed by students. They found that students progressed through stages of individual development relating to occupational information. Brittain (1965) provided guidelines and suggested procedures for identifying needs and resources for a home economics gainful employment program in home care that may be utilized in other occupational fields. Witt and Wall (1966) used pilot projects to develop and evaluate curriculum materials relating to gainful employment in child care, clothing, family service, and food services. They concluded that work experiences should be an integral part of curriculums in these areas.

Several research studies involved imaginative approaches to obtain information. Larsen (1964) examined modern industrial management techniques, concepts, and practices to discover content. Wilson (1963) used a sociological approach to generate technical programs in community junior colleges. Lockette (1967) employed a judgmental procedure for developing vocational and practical arts education programs. Fullerton and others (1966) investigated the course offerings from 126 paramedical education programs to determine (a) courses common to present paramedical education programs, (b) the nature of the commonalities, and (c) guidelines for integration of programs. Twenty-four paramedical educators at the university, junior college, and high school level from all major medical, dental, and paramedical schools and hospitals in a metropolitan area were assembled to analyze the course offerings of the 126 paramedical education programs studied.

A number of instruments were developed to obtain information from laymen, experts, workers, employers, and others. Certain of these instruments used interesting and often novel procedures to obtain information. Usually no attempt was made, however, to check the validity or reliability of the data actually collected. An exception was the study by Courtney (1962), who developed an instrument consisting of 148 occupationally associated activities and carefully checked its reliability and validity.

The critical incident technique has been used in research related to curriculum development in vocational and technical education. It was not emphasized in recent studies. However, the technique, integrated with other developing approaches, may be worth consideration in future studies.

Focus of Research

Research related to curriculum development did not have a central focus, although a considerable amount of effort was devoted to the identification of competencies common to more than one job. Investigators also studied other relevant aspects of curriculum development that had received little attention prior to 1962.

Needs of Learners

Research related to curriculum development prior to 1962 gave minimum attention to the needs of learners, especially to the needs of groups such as the socioeconomically, physically, and mentally handicapped. Since 1962, there has been some increase of interest in meeting the special needs of these groups.

Matthews and others (1966) developed a curriculum for dropout-prone students. They used special learning units in language arts, social studies, arithmetic, science, industrial arts, home economics, physical education, and work experience. The program significantly improved the holding power of the pupils in the curriculum. The pupils involved in work experience did not significantly improve their academic performance. Phipps and Fuller (1965) conducted studies related to motivating and serving disadvantaged rural youth through a family-oriented curriculum approach.

A recognized need of learners is in the area of guidance for career planning (see also Chapter III, "Career Development"). Sherman (1966) developed a methodology for creating curriculum materials related to career planning. The theoretical construct of developmental tasks was used for curriculum planning related to career planning, and the taxonomy of educational objectives in the affective domain, was used for defining the objectives of the curriculum materials. Student attitudes and interests were used to determine the content details of the career curriculum materials developed.

Team Teaching

Team teaching and flexible scheduling attracted the attention of several researchers. These techniques were viewed as potentially helpful in developing the competencies needed by all workers or workers preparing for a family or cluster of jobs. Agan (1967) experimented with team teaching and flexible scheduling at the high school level, using curriculums for the health occupations, home economics occupations, business and distributive occupations, agricultural occupations, and certain trade and craft occupations. He identified the content appropriate for all the vocational curriculums or subgroups of curriculums in the school system studied. He also identified the special competencies of the various vocational teachers in the system and studied their ability to utilize their skills in a team teaching situation. His findings showed that it was important to involve all the vocational teachers in the team teaching effort. The results also indicated that it was important to permit pupils to identify with a particular vocational area by enrolling in one or more specialized courses in health, electronics, home economics, agricultural mechanics, and so forth. This gave the pupils security, an opportunity to analyze in a small group the instruction provided through team teaching and flexible scheduling, and an opportunity to concentrate in their primary area of occupational interest.

Educational Level

Several studies were focused on the educational level most appropriate for various types and kinds of occupational education content. Arnold (1965) developed recommendations for curriculum content at the technical education level. Halterman (1962, 1964) studied the educational needs of technicians in agriculture, particularly agricultural engineering technicians. Jacobsen and Swanson (1966) surveyed the technical requirements of industry and from these inferred curriculum requirements for higher education. Mills and Rahmlow (1966) investigated the work of electronics technicians and determined the major tasks and knowledge clusters involved. Phipps and others (1964) reported on the education needed at the technical level by certain workers in rural areas. Additional research is needed on the appropriate relationships among prevocational and vocational and technical education and the most advantageous educational level at which each should be provided.

Technological Developments

The development of new "educational hardware" should influence research in curriculum. Mitzel and Brandon (1966) used the computer in an experiment to assist instruction at the technician level. Allen (1966) studied how the computer could be used to introduce more flexibility into class scheduling. Coffey (1966) evaluated the efficiency and effectiveness of self-instructional methods for selected areas of vocational education. Unfortunately, too little attention was paid in any of these studies to developing the new and revised curriculum materials necessitated by the instructional uses of computers.

Curriculum Evaluation

New and revised curriculums resulting from changes in philosophy and changes in the world of work provided opportunities for many curriculum evaluation studies. Dupy and Hull (1966) investigated the problems of implementing new agricultural occupations programs. They found one such problem area to be teacher education curriculums; there is a need for preparing various types and levels of instructional personnel.

Johansen (1963) evaluated the distributive education programs in Iowa. The 1960 edition of *Evaluative Criteria,* the National Study of Secondary School Evaluation, was used to construct guiding principles for the evaluation. He found, using these guiding principles, major strengths in the curriculum content, with minor weaknesses.

Part-time work under the supervision of the school and the employer received increased emphasis in recent years in several occupational areas. It resulted in curriculum changes and generated related research. Mason (1961), for example, evaluated the school instruction that was directly related to the part-time work experiences of the students and provided suggested content.

A vast amount of new resource material for occupational curriculums has been published in the past five years. Horn (1966) appraised the curriculum materials developed for use by secondary home economics teachers. She examined the uses being made of them and the effectiveness of the materials in relation to the objectives of the curriculum. Many such studies are needed to appraise resource materials on several dimensions, such as the relations of the materials to manpower needs and to the task and knowledge needs of workers.

As previously noted, the rapid development of post-high school occupational programs has created curriculum articulation problems between them and secondary level programs. Moss (1966) investigated the influence of industrial arts experience on grades earned in post-high trade and technical curriculums (automotive, drafting, electrical, and machine shop). He examined the effect of differences in (a) amount of industrial arts taken, (b) grades earned in these courses, (c) content of the industrial arts courses in relation to the post-high school curriculum in which the student enrolled, and (d) the primary purpose for which the industrial arts courses were offered. Evaluation studies for other practical arts, prevocational, and basic vocational curriculum areas are needed to improve articulation between secondary school and post-high school programs.

Summary

Only a relatively few studies relating to curriculum development were cited in this chapter. Those noted do not reflect adequately the vast amount of research conducted. The studies reported were selected, not only because they reflected a trend in the kind of research being conducted, but also because of their innovative character, their research design and procedures, and the significance of their findings.

Since 1962 the interest in curriculum development research has increased, and there has been a large number of studies completed. Much of this recent research was more soundly designed than were earlier studies. Many innovative data collection and analysis techniques were utilized; factor analysis, analysis of variance and covariance, Q-sort, and many other procedures were incorporated into research designs in meaningful ways. Because of the complexity of the problems involved in curriculum development research, however, investigators must continue to be increasingly creative regarding designs and the adaptation of statistical tools. Less and less curriculum research can be justified that depends completely on simple opinion surveys.

The curriculum development literature reviewed indicates that recent research emphasized (a) the identification of content common to clusters of occupations and to all kinds of work, (b) the development of curriculums for students with special needs, (c) the adaptation of curriculums to changes in educational approaches and technology, (d) the identification of curriculum changes required by technological developments, and (e) attention to occupational areas that were previously overlooked or considered unworthy. The increased number of curriculum development projects indicates a need for more reviews such as that by Lockette (1965), in which the research findings on curriculum in one subject area can be carefully scrutinized.

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CHAPTER V

Techniques and Modes of Instruction

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This chapter reviews studies which explore the problems of teaching previously selected substantive content in vocational, technical, and practical arts education. The number of studies which have appeared since the publication of the October 1962 issue of the REVIEW has necessitated considerable selectivity in choosing research to be reviewed here.

One of the major problems has been the definition of *research* in techniques and modes of instruction. In general, this review emphasizes those studies which utilized an experimental design; quasi-experimental studies are also included. In some instances, provocative theoretical or prescriptive materials are included for their value as guides to understanding the present state of the art. Exemplary studies in each area of investigation are reviewed with the aim of presenting a representative picture of the present status of research.

Chadderdon and Fanslow (1966), Lanham and Trytten (1966), Larson (1966), Meyer and Logan (1966), Streichler (1966), Tuckman and Schaefer (1966), and Warmbrod and Phipps (1966) included sections on (a) instructional materials and devices, and (b) learning processes and teaching methods in their reviews of research in the various subject matter fields of vocational, technical, and practical arts education. In addition, Suess (1966) provided an overview of studies on teaching methods in industrial education. Rahe (1964) reviewed research in typewriting and Stevens (1966) reviewed studies in agricultural education.

Additional References: American Council on Industrial Arts Teacher Education (1966); American Educational Research Association (1967); Johnson (1967); National Business Education Association (1965); Rowlett (1964).

Instructional Media

During the period 1962-67, much of the research in vocational, technical, and practical arts education utilized modes of instructional presentation which have not traditionally been available to the teaching-learning process. In general, these modes depend upon mechanized presentation devices; additional technology may be required in the preparation or preservation of the instructional presentation. For additional information about instructional materials, see the April 1968 issue of the *Review of*

Educational Research (American Educational Research Association, 1968).

Television

Piersall (1964) contrasted closed-circuit television, a lecture, and student-directed study of an information sheet as means of teaching technical information to college freshmen. The three methods were found to be equally effective in terms of initial learning. Four weeks after treatment, groups which received instruction by closed-circuit television attained higher retention test scores than those receiving lectures only. However, the differences were not significant when retention was retested seven weeks after treatment.

Stout (1963) described an instructional television installation which could be operated effectively by the instructor as he lectured and presented demonstrations. Canada (1967) developed organizational guidelines for televised instructional presentations. Gladman (1967) described the potential of television as a medium for use in management development programs.

Additional References: Diamond (1965); Kraeer (1966); Training in Business and Industry (1965).

Programed Instruction

The decision to consider programed instruction as one of the technological media is arbitrary; it could be considered to be an example of an organizational variable which may be, but is not necessarily, mechanized. Research utilizing programed instruction in vocational, technical, and practical arts education has evolved somewhat more slowly than in other educational areas. However, a substantial number of studies were conducted during the period covered by this review; only a representative sample is included here.

Lease (1964) compared the effectiveness of a commercially available program and a textbook mode of presentation for introductory electronics at the college level. The two modes did not produce significant differences in achievement either on factual questions or on application questions on the criterion test.

Grubb (1965) used a programed presentation designed to influence vocational values in a study with high school students. Significant improvement was indicated in the category, "self-realization of work," but the program was not successful in producing significant improvement in other categories of vocational values on the criterion tests.

Bertrand (1964) trained prison inmates in programing techniques and guided the development of programs in electricity, vocational guidance, and barbering. The study evaluated the programs, in both book and machine format, as they were used in instructional activities in the prison. The book format yielded better results in the prison classrooms, while teaching machine modes of presentation yielded better results when subjects were permitted to study the course content in their cells.

The results of long-range applications of programed instruction in two industries indicated that programed instruction substantially reduced training time. In addition, subjects who learned by means of programed instruction achieved higher scores on criterion tests than those who received conventional industrial training (Training in Business and Industry. 1966a, b).

Ofiesh (1965) identified criteria for evaluating programs and specified guidelines for developing a training system based upon programed instruction. Dolmatch (1962) provided specific criteria for evaluating programed instruction in industry.

Markle (1967) outlined several precautions which would improve the accuracy of studies designed to evaluate the effectiveness of programs. The importance of an identifiable standard to communicate the sensitivity of an experiment was emphasized by Lumsdaine (1963). He urged the improvement of the null-hypothesis approach in experimentation and pointed out the need to consider instructional time and results in interaction. Lumsdaine also indicated that self-instructional media offered fruitful opportunities for more definitive research on such basic problems as optimum difficulty level, feedback, and the effects of response mode and organizational variables.

Additional References: Dannenberg (1965); Ebbert, Clouse, and Darby (1964); Manchak (1965); Margulies and Eigen (1962); National Society for the Study of Education (1967); Ruehl and Hofer (1965); West (1965).

Tape Recordings

Hodge (1966) found that four-channel dictation equipment produced highly satisfactory learning in shorthand classes. Success in the use of tape recordings in the teaching of shorthand was also reported by Hanson (1967). However, Hanson found that controlled tape dictation, if used for all homework writing, resulted in reduced knowledge of shorthand theory.

Rowlett (1963) reported that the directed discovery and direct-detailed methods were both effective means for organizing tape recorded instruction on orthographic projection principles. In a replication by Suess (1965), a limited degree of manipulation of three-dimensional models and paper-and-pencil activity was used to supplement the tape recorded instruction. In this study, control group performance on the criterion test approached the achievement of the treated groups; no significant treatment effects were attributed to the experimental variables.

Additional Reference: Van Derveer (1965).

Multimedia Modes

Shemick (1965) contrasted instructor demonstrations of metal spinning with individualized instruction by means of a device which simultaneously projected 35mm slides and played a magnetic tape cartridge. Subjects who received their instruction by means of the multimedia device required fewer assists from the instructor to produce a spun aluminum bowl; however, the same subjects required more time, took more trials, and did not attain the performance quality exhibited by subjects who observed a demonstration. Moeller (1967) used 8mm film and synchronized tape recordings to teach elementary engine lathe operation. Subjects receiving the experimental treatment performed at the same accuracy level as subjects who received individual demonstrations, but the experimental subjects required more trials and took longer to attain the criterion performance.

The time required to train industrial assembly workers was reduced 50 percent when the training sequence was presented by a machine using color slides and tape recordings (Training in Business and Industry, 1966c). Further work in simplification of the methods used to present the training sequence led to the development of a system of booklets using color photographic prints and handwritten instructions on a series of cards, plastic-bound into booklet format. These simple booklets were apparently as effective in training assemblers as were the more sophisticated machine presentations, yet the booklets were much easier to modify as necessary to accommodate engineering changes in the product being assembled.

Textbooks

Miller (1966) administered original textbook materials rated at the eleventh-grade readability level and rewritten material with readability rated at the sixth-grade level to seventh- and eighth-grade subjects. No significant differences in achievement were obtained between groups reading the material at the two readability levels; there were no differences even when the analysis investigated the achievement test scores of subjects at different levels of reading ability. Miller questioned the usefulness of traditional readability ratings for technical content in which technical terms, which cannot be modified to reduce readability level, make up a significant portion of the total material.

Bjorkquist and Kolker (1966) analyzed the reading ease of the textbooks used in two technical programs which served unemployed adults. Textbook readability level was much higher in one program than in the other; nevertheless, trainees perceived their homework assignments as more difficult in the program using textbooks with the lowest readability ratings.

Additional References: Drew (1964); Miller (1962).

Other Media

Bjorkquist (1966) investigated the degree to which learning of principles of orthographic projection could be improved by the provision of scale models or pictorial drawings. Subjects who had the opportunity to learn with the assistance of pictorial drawings or scale models acquired the principles with fewer trials than subjects who had no visual aids. Differences between groups receiving pictorial drawings and scale models were not significant for the learning task. The group which had received pictorial drawings, however, was more efficient in solving a transfer task than were groups receiving no visual aids, groups given scale models, and an untreated control group. Differences among the latter three groups were not statistically significant.

Baker (1966) used stereo slides, two-dimensional slides, and chalkboard lectures as presentation media in teaching the principles of one-point perspective drawing; the three modes were equally effective. Hofer (1963) found that students utilizing self-instructional booklets containing photographs and printed instructions learned terminology and procedures as well as students who received teacher demonstrations; lower ability students learned better from the self-instructional materials. Students who observed demonstrations required more individual assistance, and hence more teacher time, than those who used the self-instructional booklets.

Status of Media Research

Taylor and Christensen (1967) reviewed the present status of instructional media in vocational education. Their outline of the potential uses of individualized instruction, packaged learning, television, and simulation provided a foundation for their appeal for concentrated research efforts in the evaluation of media.

Research in the applications of instructional media has not yet been successful in identifying principles or generalizations of value to practitioners in vocational, technical, and practical arts education. In many instances, research evidence is contradictory; at best it is inconclusive with regard to the effectiveness of most media.

At least a part of the lack of clear-cut evidence may be attributed to the approach used in the planning and conduct of media research. VanderMeer (1964) advocated the utilization of a team of investigators, each an expert in a supporting area, in an attempt to obtain scientific data on the effectiveness of the media under observation. Phillips (1966) concluded that only an instructional systems approach can answer research questions related to the interaction of media, learners, teachers, and classes. Lumsdaine and May (1965) considered many types of media research to be "product-testing" rather than method-testing and advocated research designed to provide a basis for predicting probable outcomes from the application of specific media in known situations. They emphasized the need for improved definition of variables and better analysis of interaction effects in media research. Zinn (1967) reviewed the educational research on computer-assisted instruction and identified trends and projected needs in the area.

The effectiveness of the various media for generalized instructional problems in vocational, technical, and practical arts education has not yet been fully determined. Additional experimental evidence is needed to develop guidelines which indicate the types of educational purposes best served by each of the instructional media. As the array of available media increases, the need for adequate evaluational research becomes ever more urgent.

Organization for Instruction

Arrangement of Content

Researchers in vocational, technical, and practical arts education have attempted to evaluate the application of specific learning theories dealing with the organization of content to teaching-learning problems. Tomlinson (1962) presented a complex cognitive learning task by four methods: (a) inductive; (b) inductive-discovery-confirmation; (c) deductive; and (d) inductive-discovery. Instruction time totaled 45 minutes; subjects were tested immediately after instruction, one week later, and five weeks later. A number of statistically significant differences were obtained but the direction of the differences appeared to be influenced by the specific criterion instrument used to assess learning, retention, and transfer.

Pucel (1966) modified traditional instruction sheets by introducing two types of "organizers": (a) a summary organizer of a directive type and (b) a question organizer of a discovery type. No significant differences in initial learning, retention, or transfer were obtained when the two experimental treatments and the typical instruction sheet were used to present difficult and moderately difficult material to vocational school students.

Dawson (1965) administered a highly generalized, inclusive, and abstract reading passage as a "preorganizer" prior to a reading assignment. Subjects who read the preorganizer passage in addition to the reading assignment attained significantly higher criterion test scores than subjects who had no exposure to the preorganizer. This difference in initial learning and retention at three weeks was not obtained when retention was assessed again nine weeks after treatment. The preorganizer used in the study was more helpful to subjects in the lower half of the ability range.

Sullivan (1964) presented orthographic projection principles through the use of an axonometric system which was considered to provide a unifying, underlying structure for presenting orthogonal views and a pictorial view in a single, integrated format. Groups which received axonometric instruction attained higher initial learning and retention test scores than groups receiving traditional orthographic drawing and step-by-step instruction in isometric drawing; results on the transfer test were not conclusive. In general, the results of the study tended to support the point of view that an understanding of a theoretical structure improves the learner's capacity to perform under conditions closely related to the learning situation.

Organizing Learning Experiences

House (1966) found that poorer students spent more time studying bookkeeping than did better students—often more time than they thought reasonable and often more than for other courses. He recommended that teachers should attempt to identify the relationships between the time required for students to complete their assigned work and the achievement of the students in the course.

Koble (1963) found no significant differences in his comparison of the effectiveness of individual-oriented and group-oriented learning experiences. Subjects in his study were tested for the acquisition of content information and the development of perceptual motor skill.

The use of cooperative educational programs, wherein some of the vocational skills are acquired during on-the-job periods in industry, has been explored by Burt (1967). Utilization of this technique at the college level has been useful for approximately 10,000 students in 96 colleges (Training and Development Journal, 1967).

Additional evidence is needed about the influence of organizational variables upon the mastery of various types of learning tasks. Well controlled studies incorporating larger samples of content are required to evaluate the long-term effects of manipulation of the many complex, interacting, independent variables in the organization of instructional content.

Additional References: Bown, Casimano, and Goodell (1962); Sedgwick and Misfeldt (1967).

Learning Outcomes

Concomitant Learnings

There has been some research interest in ascertaining the degree to which individuals acquire information not specifically included in the deliberate instructional presentations. Clayton (1966) found that students who typed copy which presented information about economic concepts improved their understanding of economics as an outcome of their typewriting class. A short period of direct instruction on economics, however, was more effective in improving understanding of economics than was an extended period of typing the material. Thieme (1965) integrated industrial arts construction activities in the classroom activities of fifth-grade students. Achievement in map skills and work-study skills was measured at the end of the fifth grade and at the start of the sixth grade; none of the differences between groups receiving "traditional" instruction and those receiving supplemental industrial arts instruction were significant.

Creativity

Anderson (1963) reported limited success in his attempts to improve performance on a battery of creativity tests. No clear-cut advantages were apparent for the two methods compared: (a) a series of written brochures and (b) a series of instructor-led classroom discussions. Karnes and others (1967) investigated the effect of the use of typewriters by academically talented students in the intermediate grades. Students who had received instruction in typewriting and who used typing in their school work showed greater gains in creative thinking and creative writing than their counterparts who did not receive typing instruction.

The difficulties inherent in attempting to predict creative performances and to identify and classify the products of creative acts have been illustrated in studies by Moss (1966) and Duenk (1966). Moss pointed out the need to identify the factors which influence specific types of creative behavior in order to rationalize techniques of teaching for creativity.

Skill Development

Hull (1965) studied the effect of practice upon the performance of manipulative and intellectual tasks. All experimental subjects received a training program based upon a task analysis for each task. A practice period was found to be more effective than repetition of the training in improving performance on the manipulative task; no such difference was obtained on the intellectual task. Performance of the intellectual task was positively related to intelligence, but this was not the case for the manipulative task.

Wills (1965) found that an emphasis on speed of performance in a metalworking class resulted in increased productivity in the classroom. The quality of output under speeded conditions was approximately equal to that produced under unspeeded conditions. However, emphasis upon speed of performance increased student errors and increased the quantity of materials required to achieve the criterion output. West (1966) found that deprivation of vision increased the number of errors committed by beginning typists. Visual cues appeared to be important in guiding initial responses, providing necessary information for altering incorrect responses, reinforcing correct responses, and reducing learner anxiety level.

Pankowski (1965) presented guidelines for instruction intended to develop motor skills. After considering studies of such factors as physical capacity, distribution of practice, speed, accuracy, and part versus whole learning, he described the progressive changes which accompany mastery of a motor skill and postulated principles to guide instruction.

The lack of a fully adequate method for logical analysis of the requirements inherent in any skilled performance further restricts the applicability of research findings. That is, most studies in techniques and modes of instruction have failed to specify precisely which factors in task performance were to be developed by the learning system. Fitts (1964) reviewed research on the learning of skills and developed a theoretical view of skilled performance. Fleishman (1965) developed a taxonomy of perceptual-motor abilities and used it in evaluating a series of studies. He pointed out that the high degree of specificity of perceptual-motor tasks restricts the ability to generalize from one area to another. Fitts (1965) emphasized the importance of overpractice in the mastery of industrial tasks. In addition, he pointed out the need to organize a training program to provide extensive practice in the subtasks.

Summary

The increasing number of studies in techniques and modes of instruction is an encouraging sign of healthy concern with an area of vital educational importance. While few researchers in vocational, technical, and practical arts education have devoted their efforts to basic research on learning, many have studied specific teaching-learning problems, though often without relating their studies effectively to other research. Brandon and Evans (1965) noted that researchers in vocational, technical, and practical arts education are often unaware of similar work being done by others in related fields. This may be one of the reasons that substantial research activity has not yet made significant contributions toward the establishment of a body of knowledge on techniques and modes of instruction.

As research activities increase, it is imperative that researchers exert a concerted effort toward problem areas of widespread concern in vocational, technical, and practical arts education. Well designed studies evaluating specifiable variables under controlled circumstances and utilizing valid and reliable criterion measures are most likely to yield generalizable results. As evidenced by the studies reviewed in this chapter, an encouraging start has been made in this direction.

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CHAPTER VI

Organization and Administration

ALLEN LEE and HERBERT M. HAMLIN

There was no chapter on organization and administration in the October 1962 REVIEW which last summarized research in vocational, technical, and practical arts education, although two studies of this type were reported in an introductory chapter. Many of the studies of educational organization, administration, and finance reported in the October 1967 issue of the REVIEW have implications for vocational education, but few dealt with the problems peculiar to vocational education.

During the six years since research in vocational education was last reviewed, it has probably been given more attention than it had received during all the years preceding 1962. Funds, personnel, and facilities for research have become available from federal, state, and private sources. Research in the field, long undernourished, developed almost explosively. The period should therefore be treated in an unusual way. Several significant new agencies for research in vocational education have not had time to complete very many projects, but attention will be given to their potential. Public policy decisions condition what can be done in providing organization, administration, finance, personnel, and facilities; hence, studies of policy and planning, organization and administration, public information, and public relationships will be included in this review.

Several investigations, including some which have had great impact, are not reviewed in this chapter because they have not been reported in standard publications and are not generally available. These are the studies which have preceded the organization or reorganization of vocational education by school districts, larger areas within states, and states. For example, comprehensive state surveys were made in at least 30 states, most of them contributing to changed state policies relating to organization, administration, finance, personnel, and facilities for vocational education. Many of the state surveys dealt with the organization of area schools to provide vocational and technical education: junior and community colleges, vocational schools, technical institutes, branches of universities, and high schools serving students from a number of local districts. Many other studies were made in areas within states that were planning or replanning schools of these types. In addition, there were a number of significant local studies. About 33 doctoral theses were completed on subjects related to this chapter, and 17 of them dealt with problems of organization and administration.

Policy and Planning

Venn (1964) raised basic questions regarding occupational education in the public schools in reporting a study conducted for the American Council on Education. The study has gained added significance because Venn subsequently became Associate Commissioner for Adult, Vocational, and Library Programs, U.S. Office of Education. Included among his 15 recommendations were proposals that (a) occupational education become an integral part of total education and a responsibility of every segment of the total educational system, (b) continuing occupational education be provided for everyone, (c) occupational information and counseling be improved, (d) vocational-technical education become a major part of the mission of the two-year colleges, (e) all high school youth be equipped on leaving school with marketable occupational skills or preparation for further occupational education, (f) guidance and placement be provided for dropouts, and (g) placement services be available in all educational institutions which students leave to enter employment.

Although the U.S. Department of Health, Education, and Welfare report of the Panel of Consultants on Vocational Education (1963) did not deal directly with organization and administration, its widely heeded recommendations regarding clientele to be served and programs to be offered have incited reorganization and new modes of administration.

The Advisory Commission on Intergovernmental Relations (1965) proposed to the state legislatures that increased attention be given to vocational and technical education in the suburbs of the great cities, holding that the need in them is not much different from that in the great cities but that this type of education is generally neglected by suburban schools.

Smith (1963) recommended a vocational education program for the state of Michigan following an extensive study. He dealt in detail with secondary and postsecondary programs, finance, and state supervision. He included reports on the organization and administration of vocational-technical education in California, Connecticut, Florida, Illinois, Kentucky, Minnesota, North Carolina, New York, Ohio, and Pennsylvania. He urged that vocational and technical education be an integral part of all education, but expressed a belief that the hub of the vocational education system will be the comprehensive area postsecondary and adult education institution. The public, he said, favors initial employment later than at high scool graduation, and employers favor the older employee who has taken his vocational training in a postsecondary institution.

Maddox and his associates (1967) reported a four-year study of human resource development in 13 Southern states which dealt extensively with the status of education and particularly with vocational-technical education. The report urged "early and continuing orientation of children and youth toward useful work, beginning in the elementary schools and continuing through the junior and senior high schools." Special attention was given to the area schools which provide vocational-technical education in each of the 13 state systems. The report also noted a lack of balance among vocational offerings and a deficiency in occupational information and guidance, and paid considerable attention to improving the personnel engaged in education and to providing the finances needed.

Levitan (1963) reviewed critically federal policies for vocational education and the 1963 report of the Panel of Consultants on Vocational Education. He stressed the need for better adjustment of programs to occupational demands and for more adequate records of the occupational experiences of graduates with and without specialized vocational-technical education. Attention was also given to programs outside the schools, including those of the Armed Forces and the vocational rehabilitation and manpower training programs.

Hamlin (1962) reviewed the history and status of policy for public school education in agriculture, gave attention to the nature of policy and the policy-making process, indicated issues to be faced in developing policy, and then suggested principles to be included in policy statements. Cushman and Jarmin (1965) studied the organization and use of agricultural advisory boards in New York State.

Lee and others (1968) made a critical qualitative analysis of existing occupational education and pinpointed teacher education as the key element in preparing to meet the challenge for change. This study stressed (a) the narrowness of many programs, (b) the dearth of truly comprehensive secondary schools, (c) the fact that state divisions had generally limited their attention to federally reimbursed programs, (d) the probability that curriculum change lagged behind the need for it, (e) the fact that state directors did not realize their potential for influencing teacher education, (f) the need for teacher education to develop leaders and teachers with a current philosophy, and (g) the need for a partnership between the education establishment and the private sector. Lee also reviewed Morgan and Bushnell's (1967) "Organic Curriculum," noting its general excellence but also the concurrent lack of development and adaptation to individual state needs. Emphasis was on the need for teacher education to change with alacrity and vision and for the states to focus on refinement and adaptation of the organic curriculum to meet the needs of the eight of ten students who will not receive a baccalaureate degree.

Organization and Administration

Will (1964) revived interest in study of the structure of all state-conducted education at a time when it was receiving little attention. McLure (1965) summarized his research by stating a rationale for organizing, administering, and financing vocational education. Moss (1965) reviewed research in the administration and supervision of industrial education. Graney (1964) reviewed in some detail the organization and administration of technical education in public and private institutions in a chapter of his book on *The Technical Institute.*

Mason (1963) studied the organization and administration of vocational education in selected Michigan high schools. The National Education Association (1964) conducted an exploratory study of secondary school programs shared by public and nonpublic schools; it revealed that a large part of those programs were vocational or practical arts. Wenrich and Ollenburger (1963) found that a majority of 123 Michigan high school principals lacked time for administering programs for employment-bound youth and believed that programs for them could be improved if funds were made available to hire administrative assistants.

Harris (1964) prepared a monograph on technical education in the junior college for the American Association of Junior Colleges. The Georgia State Department of Education (1966) gathered and published extensive data regarding the state's system of area vocational and technical education. Pickett and others (1966) conducted one of many studies preliminary to the establishment of area vocational-technical schools. Uxer (1967) developed an operational research model for locating area vocational schools. Research preceded and is accompanying the development of a technology research center for vocational-technical education at Rutgers—the State University of New Jersey (1966).

Lee (1967), Pierce (1967), Ross (1967), and Swanson (1967) concentrated on a study of the role, organization, and administration of vocational education at the state level in 41 states. Structured interviews were held with some 1,800 persons, including legislators, board members, administrators, vocational educators, and interested laymen. Findings pertaining to perceptions of the current status and conceptual ideals for roles and responsibilities, as well as quantity and quality of programs, were utilized as a foundation for the development of a prototype instrument (format and criteria) for self-analysis by state agencies for vocational education. The instrument was initially field tested in 1967 as a prelude to further development and refinement. Results reported include a volume on "perceptions." The prototype instrument for self-analysis is also contained in a separate volume.

Morgan and Bushnell (1967) proposed an "organic curriculum," balancing and fusing vocational and general education from the kindergarten through adulthood, and initiated pilot programs in 18 school systems scattered across the country. Draper (1967) reported to the National Association of Secondary School Principals his findings from an extended study of vocational education in the high schools. He suggested ways of making an appropriate type available to many not now enrolled in vocational programs.

Allen (1966) adapted computer-based scheduling to programs of vocational education after several years of developing it for other secondary school subjects. Changes in curriculum design, staff assignment, and plant utilization were involved. The arrangements tried are intended to serve more students and to articulate vocational education with the rest of the school program. The project, three years in duration, is in its second year.

Hamlin (1965) developed suggestions for introducing, organizing, and administering programs to prepare for occupations, other than farming, which require some knowledge of agriculture. These suggestions, designed primarily for board members and administrators, may be applied in introducing many new forms of occupational education.

Burt (1967) investigated school-industry cooperation in vocational-technical education in 32 cities throughout the United States. Interviews were conducted with several hundred persons associated with the local schools, the junior colleges, state departments, trade and professional associations, unions, and advisory committees. The report deals with federal and state legislation and regulations, general advisory committees, occupational cooperating committees, joint apprenticeship training committees, and the industry program coordinator. Studies of privately operated vocational and technical schools and out-of-school agencies have been conducted by Clark and Sloan (1962, 1964, 1966), Kincaid and Podesta (1967), and by the Texas Education Agency (1963).

Personnel

Stevenson (1966) secured information from 29 state divisions of vocational education and 111 institutions preparing vocational teachers regarding the prospective shortage of personnel for professional positions other than teaching. A shortage of 1,270 persons during the ensuing year was predicted by these agencies. An intensive recruitment program was recommended.

The New York State Education Department (1965) reported on the supply of and the demand for teachers of home economics in the state. Data from 82 percent of the administrators of the state's 783 school districts showed a need for 500 replacement teachers and 497 new teachers during the period 1964-68. Accessible, low-tuition programs to prepare teachers were recommended to prevent an impending shortage of teachers.

Richland and Rosove (1967) explored the feasibility of developing a computerized system to match military retirees to job vacancies in vocational and technical education. He concluded that there are thousands of military retirees who are occupationally and educationally qualified for vocational teaching positions. He found no insuperable barriers in state certification requirements or any existing systematic procedure for channeling military personnel into vocational positions.

Finance and Facilities

Hirsch, Segelhorst, and Marcus (1964) and Weisbrod (1964) have been trying to discover a fair allocation of the costs of public education among the local, state, and federal governments. Frequently more than half of education's costs are paid by the state and federal governments. Migration of those trained, now commonplace, distributes the benefits of training. How much local control and how much local financing is justified under these circumstances?

Davie and Patterson (1966) studied intergovernmental fiscal relations in vocational education. Federal grants-in-aid were traced from 1917 to 1963. No perceptible pattern of response by the states and localities was found when federal funds were increased or decreased. Easing of matching requirements was recommended. Adjustments in methods of determining allotments to the states were suggested. The Wisconsin State Department of Natural Resources (1967) projected the state's needs for vocational, technical, and adult education facilities based upon past trends and existing conditions.

Organization for Continuing Research

Several research-related organizations have been created which focus on problems in vocational, technical, and practical arts education. The Center for Research and Leadership Development in Vocational and Technical Education, Ohio State University, has a primary interest in the preparation and upgrading of personnel. These, together with program evaluation, are often found to be major ingredients in the projects conducted by the Center. The Center for Occupational Education, North Carolina State University, will soon report a study of policy, policy making, organization, and finance in 13 Southern states. Also imminent is a report of a study of occupational education personnel in those states. Problems of organization and administration, particularly in public area vocational schools, are dealt with in several of the Center's projects. The Oregon State System of Higher Education has established a unit concerned with research and development in educational policy and in organization and administration.

New agencies which, among other functions, provide data for planning state programs of occupational education have developed in most of the states. These are usually designated as "Research Coordinating Units." Studies in 20 states, funded by the U.S. Office of Education, have preceded or accompanied the organization of these research coordinating units.

The reorganization of the U.S. Office of Education's Bureau of Research, and especially the creation of the Division of Comprehensive and Vocational Educaton, offers promise for the future. The administrators of research and development funds within the Bureau and Divisions are encouraging attention to studies on organization and administration. It may be anticipated that many institutions and individuals, not heretofore engaged in this type of research, will be enticed into it.

Gaps in Recent Research

The research in organization and administration during the past six years does not add up well. Great gaps remain almost untouched by research. Some of the areas to which far more attention should be given are the following:

(1) The organization of appropriate occupational education for everyone, provided jointly by public and private agencies at the times in life when it is needed;[1]

(2) The provision for occupational education in school systems which do not now offer it or which make it available to only a small percentage of the students, e.g., small high schools, schools in most suburbs, inner-city schools, and schools which dislike the federally aided program but have provided no alternatives;

(3) The organization of new state and interstate agencies to serve those who cannot be well served by existing institutions;

(4) The impact of federal policies on the state and local organization of occupational education;

(5) The organization of occupational education in the local public schools and the public area schools in relation to occupational education conducted by other public agencies and by private agencies;[2]

(6) Provisions for analysis and evaluation of administrations, organizations, and institutions (with implications for accreditation);

(7) The policies and the policy-making arrangements responsible for introducing change into the system.

Some of the research gaps are likely to be closed by established leaders in educational organization and administration, economics, political science, and sociology, who are attracted to the study of problems relevant to vocational education. Other younger men, trained in these areas, are now being employed on staffs of the principal centers for research in vocational education. They will bring many of the talents required for the resolution of interdisciplinary problems.

The Outlook

The comment drearily made in all previous reports must be made in this one: Most of the research during most of the period covered has been done by graduate students. A bright exception in this 1968 report is that specialized agencies for research are developing, some of them well financed and staffed, but all too new to have realized their potential. Significant examples include the organizations at North Carolina State University, Ohio State University, and the Oregon State System of Higher Education.

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[1] Occupational education is here defined as education designed to contribute to occupational choice, competence, and advancement. It includes vocational, technical, professional, and basic education, as well as counseling, and the special contributions of the practical arts and other forms of "general education."

[2] The costs of vocational and technical education provided by business, industry, and schools conducted for profit have been estimated to exceed $20 billion annually, many times the cost of public vocational and technical education.

Vocational education is often provided as an investment. It is supported by business and industrial elements accustomed to researching the investments they make. More than in many other types of education, sound research must underlie recommendations for the organization and financing of vocational education. Funds for these studies can be secured.

Preparation for useful and remunerative employment is now viewed by many civic leaders and policy makers as a major means of reducing poverty and relief rolls, juvenile delinquency, and disorder in the cities, so that increasing support from public funds seems likely. However, unless there is continuing research and the use of research findings in replanning the organization and administration of the field, disillusionment is likely to follow the current increase in public spending.

The basic needs of the times appear to be (a) clearer definition of the problems in organizing, administering, and financing occupational education; (b) closer cooperation between researchers and practitioners; (c) increases in personnel and time specifically assigned to the field; (d) better communication among those doing research in related fields; and (e) use of the findings in situations where their value can be demonstrated to the public and the profession.

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CHAPTER VII

Staffing

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Recent research reports on staffing in vocational and technical education have revolved primarily around the recruitment, preparation, and retraining of instructional personnel. Studies of supportive personnel in vocational and technical program operation have, at best, been peripheral to studies on or about teachers.

Several excellent reviews have been compiled in recent years which include studies on staffing, teacher preparation, and related topics in vocational education. The Center for Research and Leadership Development in Vocational and Technical Education at Ohio State University provided a series of seven reviews that gave comprehensive coverage to studies and informal investigations by fields of vocational education. Each of these reviews included a section on teacher preparation and related studies (Chadderdon and Fanslow, 1966; Lanham and Trytten, 1966; Larson, 1966; Meyer and Logan, 1966; Streichler, 1966; Tuckman and Schaefer, 1966; Warmbrod and Phipps, 1966). These reviews contain over 300 bibliographic entries dealing primarily with studies in the area of staffing.

Moss (1967) conducted a review of research in vocational-technical teacher education, producing a bibliography of 141 documents and a viable framework within which to perceive research and development efforts in teacher education. A major portion of the content of this chapter has been drawn from the Moss review. Mercer (1964) compiled a bibliography of 23 items covering the period from 1920 to 1961 dealing with off-campus student teaching and professional laboratory experiences.

Inasmuch as staffing concerns and problems are not in all ways unique to vocational education, this review has included some studies which treat staffing on a broad field basis. The observations by these researchers are felt to be pertinent to concerns in vocational and technical education. Studies reviewed in this chapter are classified under the following major headings: Supply and Demand, Recruitment, Characteristics and Competencies, Preparation, and Innovations and Trends.

Supply and Demand

The reports on vocational teacher supply and demand during the years from 1962 through 1967 were largely descriptive. The conclusions were generally that severe shortages of vocational and technical education staff exist in all areas except agriculture and home economics, where overall supply seems balanced with demand except for selective shortages.

Forecasts of demand for vocational teachers show considerable inconsistency. The U.S. Department of Health, Education, and Welfare (1967) predicted the secondary and postsecondary student enrollment based on assumptions of occupational demand, growth in education facilities, and student interest, and then used a teacher-to-student ratio of 1 to 45 to estimate vocational-technical teacher demand. The resulting forecast called for 213,300 teachers by 1970 and 350,000 by 1975. These figures may be compared with the 124,729 vocational-technical teachers actually employed in 1966.

A study by Hensel (1967) polled state directors for data on numbers of full-time public school vocational-technical teachers employed in 1965 in reimbursable programs (excluding manpower development training programs) and their estimates of the numbers to be needed in 1968. The results, presented by high school and post-high school employment for each of the several vocational-technical fields, indicated that 86,261 teachers were employed in 1965 and that 22,485 additional instructors would be needed by 1968.

Another investigation (American Vocational Association, 1967) also polled state directors of vocational education for their predicted teacher requirements. In this case, it was reported that 121,870 public school teachers and 6,641 manpower development training instructors were employed in 1966 and that a total of 165,152 teachers would be needed to staff the programs anticipated for 1970.

Some of the problems of prediction are evident in these three studies. It should be relatively simple to agree upon the definition of the group for whom predictions are to be made, and, hopefully, the prediction will provide sufficient lead time to permit remedial action in the interim. Estimates, however, are only as valid as the bases used to make them, and the bases used by respondents in a survey are not only unknown, but may be inconsistent as well. Hansen (1965) felt that two variables of central importance in determining teacher supply were teacher qualifications and remuneration level, but he held also that our knowledge of the determinates of teacher supply, as well as teacher demand, was woefully inadequate.

A means of developing an inventory of potential vocational education instructors was attempted by Podesta (1966). Bates (1963) conducted a study of the potential of military personnel as a source for junior college teachers. The possible supply of teachers from the military was encouraging. Some hope for increased teacher supply also comes from the analysis by Folger (1967) which revealed that the percent of college graduates required to staff existing educational programs will decline from about 30 percent of college graduates to about 18 percent by 1973. This means that more persons will be potentially available to expand educational programs and improve areas where the quality of education could be enhanced with more teachers.

Recruitment

The recruitment of teachers for vocational and technical programs raises questions about (a) responsibility for the recruitment of potential teachers, (b) factors influencing an individual to become a teacher, and (c) techniques in recruiting.

Mills (1967) found that a large proportion of state supervisors of distributive education (43.4 percent) and distributive teacher educators (46.6 percent) gave the major teacher recruitment source as being some school or division of a college or university. About one-third of each of these same two respondent groups felt that recruitment of teachers was a joint responsibility of state supervisors and teacher educators.

Business education teachers and undergraduates were asked which factors had the greatest influence in their decision to select business education as a major (Grinstead, 1963). Their responses indicated that the most important factors were (a) the multiple vocational opportunities, (b) satisfaction to be gained by serving youth, and (c) the practical aspects of the subject matter. Differences in rated teaching success, scholastic aptitude, and academic achievement were not related to the reported factors. Only one-third of the sample had decided to elect business education before entering college.

Interviews with 19 vocational-industrial teachers (Parks, 1965) who were formerly tradesmen indicated that the major reason for their move to teaching was the failure of industry to satisfy their quest for self-realization, especially in the realm of social service. A few workers also mentioned greater job security in teaching. The key factors important to college students in choosing a teaching career (Hills and Downs, 1962) appeared to be their perception of income and advancement. A survey of 310 industrial education students (Ressler, 1966) found that the sample tended to have taken more industrial arts in high school than the national average, but that the majority still entered college without teaching as a career goal. Some respondents in this study also reported that industrial arts teachers were influential in their eventual choice of careers; the specific industrial arts teachers who influenced sample members were found to be older, more experienced, and "better qualified" than the average industrial arts instructor.

An analysis (MacLeod, 1965) of the relationships of persistence in teaching to selected biographical, psychometric, and academic variables indicated that industrial education persistors had a higher grade point average than nonpersistors. Another provocative study (Schill, 1963) revealed that length of job experience and job level before entering teaching had no relationship to stability or vertical mobility in teaching. By contrast, there was a significant positive correlation between amount of schooling taken before and after entry into teaching.

Former vocational instructors are another source of teachers. A survey was made of 205 former teachers who graduated from degree programs in home economics, agriculture, and business education and who taught for at least one year before leaving the profession (Thompson, 1966). The peak leaving period was after two to four years of teaching. Encouragingly, 55 percent of the sample held positive attitudes toward returning to teaching. Sex differences in attitude were not reported.

Spence (1967) reported that over 62 percent of 153 teacher education programs used one or more of the following practices to recruit high school students: (a) sending faculty to special high school career days, (b) mailing brochures to industrial arts teachers, (c) participating in on-campus senior visiting days, and (d) mailing brochures to counselors. Another investigator (Jahrman, 1964) studied recruitment techniques and concluded that sending teacher educators to the high school to conduct recruitment activities was probably the most effective practice. Richland and Rosove (1967) concluded that there does not exist at present any systematic procedure for channeling interested and qualified military retirees into vocational education.

Characteristics and Competencies

There is little doubt that the personal qualities, subject matter knowledge, and teaching skills of vocational teachers are important to performance. The problem is to identify the kinds and amounts of each of these competencies which distinguish between acceptable and unacceptable performance in order to provide specific goals for use in curriculum development and for teacher evaluation.

Interest, personality, and attitude are factors frequently investigated as possible predictive measures of effectiveness as a vocational or practical arts teacher. Teacher educators and cooperating teachers provided ratings of the teaching success of about 150 agricultural education student teachers; in addition, descriptions of actual student teacher behaviors were gathered (Fuller, 1963). The researcher devised and administered an instrument to the student teachers designed to measure three factors in each of the areas of student background—interest, personality, and attitude. The multiple linear correlation coefficient between factor scores and rated student teaching success was only about 0.23. Students who were judged very effective teachers were described as fair, kindly, alert, attractive, responsible, steady, and poised; below-average student teachers were depicted as evasive, dull, stereotyped, uncertain, disorganized, inflexible, and narrow.

Three studies in industrial education have also attempted to predict teacher effectiveness. Frinsko (1962) found that undergraduate honor point ratio and scores on the *Minnesota Teacher Attitude Inventory* were significantly correlated with rated student teaching performance. Vacek (1962) reported that the *Edwards Personal Preference Schedule* succeeded in distinguishing between "most and least successful" industrial arts teachers, as well as between industrial arts freshmen and freshmen in five other curriculums, between industrial arts freshmen and seniors, and between industrial arts freshmen and teachers. Thomas (1964) found no significant relationship between the competence of 168 industrial arts student teachers and their "dogmatism" as measured by the *Rokeach Dogmatism Scale*.

Crabtree (1965) utilized a panel of six judges to suggest weightings for deriving composite predictor scores from 34 separate measures obtained from a battery of tests which included the *Guilford-Zimmerman Temperament Survey* (GZTS) and the *Minnesota Counseling Inventory* (MCI) and cumulative quality point average. A composite teaching success score for the 66 home economics instructors in the sample was also derived from the panel's suggestions for combining (a) gain scores on tests of their ninth- and tenth-grade pupils' ability to solve problems, (b) two tests of teacher-pupil rapport, and (c) adjustment to school and community as rated by the school administrator. The best predictors correlated 0.41 with composite "success"; the most useful predictors proved to be academic achievement, two scores from the GZTS, and two scores from the MCI.

Various measures of job satisfaction have also been used as the dependent variable in studies dealing with industrial education students and teachers. The *Minnesota Vocational Interest Inventory* (MVII) successfully discriminated between the expressed satisfaction and dissatisfaction of experienced industrial education teachers, and between satisfied and dissatisfied freshmen in industrial arts teacher education programs (Nelson, 1962). Another study (Messman, 1963) showed that both the MVII and the *Edwards Personal Preference Schedule* (EPPS) differentiated between industrial arts freshmen and a norm group; it is therefore likely that the "need" variables measured by the EPPS are related to the vocational interest variables measured by the MVII. In a third study (Nelson, 1964), the EPPS was found able to distinguish among groups of (a) college men, (b) industrial arts students from four teacher education institutes, and (c) industrial arts teachers. Encouragingly, there was a consistency in the way that the industrial arts student and teacher groups differed from the normative group of college men.

The identification of performance qualities and desired subject matter competence has been the focus of several studies. A number of researchers in business and distributive education have used the critical incident technique to identify pedagogical and personal competencies required by teachers (e.g., Garman, 1965; Harris, 1967; Perry, 1964; Samson, 1964). The outcome of each incident was judged desirable or undesirable by the reporter, and the teacher's behavior during the incident was accordingly labeled effective or ineffective. The kind of significant teacher behaviors found by the studies were fairly consistent, but the judgments regarding their effectiveness (whether they resulted in desirable or undesirable student outcomes) often differed between and within studies depending upon the group making the judgment.

The professional abilities most frequently attributed to successful home economics teachers by state and city supervisors in New York and Indiana included being able to plan lessons properly, manage a class well, gain and maintain rapport with students, and work cooperatively within the schools and community (Spencer, 1963). The same supervisors felt that planning and organizing work and communicating the contributions of home economics to others were the two areas in which teachers needed the greatest improvement.

Technical education teachers rated by directors as highly successful usually attended state universities, while low success teachers attended other four-year institutions (Storm, 1966). High success teachers also had more advanced degrees but less teaching and industrial experience than low success instructors. Seven essential qualities of the adult basic education teacher were identified by Pearce (1968). Depth interviews with 85 students, seven instructors, and two administrators produced the following rank order of attitudes and skills: understanding, flexibility, patience, practicality, humor, creativity, preparation.

The commonality of requirements among vocational teachers was explored by Courtney (1967). He developed an instrument to establish a core of professional knowledges and abilities required in training programs for vocational teachers. The instrument has 200 components, using Likert scales to rate the need for each knowledge and skill in the worker's job.

Preparation

The preparation of vocational, technical, and practical arts education teachers has been given more attention in both descriptive writing and in research than any other single aspect of staffing. The demand for increased numbers of qualified staff has stimulated interest in new and unproved patterns and practices in teacher education.

Broudy (1965) described criteria for the professional preparation of teachers and made a strong philosophical case for the importance of professional teacher education. He maintained that a fully developed program of professional training should contain segments of a foundational dimension, general theory, and specialized technology.

The recent increase in the use of internships in teacher preparation programs, noted by the National Education Association (1963), makes apparent the need for additional criteria for the conduct of guided internships. Student teaching and internship programs have, in fact, been investigated by researchers in most vocational fields. One such study (Cappiello, 1964) revealed the opinions of beginning teachers and supervising teachers concerning satisfactory and unsatisfactory elements of the student teaching experience. Among the desirable elements were (a) teaching for a full semester in the senior year, divided into two different school situations; (b) teaching in the area of greatest subject matter competence; (c) compatibility of personality between the student teacher and his immediate supervisor(s); and (d) college personnel visiting student teachers, by appointment, about every three weeks. The results of a questionnaire survey (Littrell, 1965) indicated that student teachers expected to be exploited to some degree, but felt that it was asking too much of them to act as substitute teachers while the regular instructors took an extended rest!

Guidelines for the preparation of vocational teachers have been developed by Cook (1966) and Sweeney (1966). In the Cook study, 52 business education supervisors developed guidelines which were then sent to 1,200 additional supervisors for comment. Nineteen guidelines were finally selected to suggest the qualities and competencies office teachers should have. Among the 10 recommendations by Sweeney was that field and class experiences be provided counselor candidates to help them become more knowledgeable about the skill levels required by trade and technical workers.

The availability of funds for the Vocational Education Act of 1963 stimulated the conduct of numerous special workshops, developmental courses, pilot programs, conferences, and similar efforts to prepare, upgrade, or redirect teachers or potential teachers of various vocational technical subjects. Typical of these efforts were dental assisting (Barton and others, 1966); agriculture (Agricultural and Technical College at Cobleskill, New York, 1966); instrumentation (Ziol, 1966); and food service (Hollandsworth and Barbour, 1966). An inquiry by Long (1968) revealed that about 40 percent of the institutions offering curriculums for office education coordinators instituted these programs after 1963. About 42 percent of the office teacher educators felt that the provisions of the Vocational Education Act would have little or no effect upon the operational freedom of the teacher preparation program. The experimental summer institute for new vocational teachers conducted by Samson (1966) resulted in a recommendation that such workshops be no less than nine weeks in length, with three of the weeks devoted to full-time field study in the community where the teacher is to serve.

Efforts to create new models for advanced degree work in vocational education were undertaken by Schaefer and others (1966) and O'Brian and O'Neill (1966). The first produced recommendations for a model doctoral program, and the second developed a master's degree curriculum for teachers who would work with youth having special needs.

Credit for industrial work experience was investigated by Lauda (1967). He found 49 of 201 industrial teacher education institutions granting credit, and about 40 more were planning to do so in the near future.

Innovations and Trends

The most appropriate teacher preparation and in-service training for vocational, technical, and practical arts education has yet to be determined.

Teacher competency in the subject to be taught is an obvious necessity, but there is an ever-increasing need for the teacher to have competence in current educational technology as well.

David Allen (1966) asked 50 trade and technical leaders from 38 states to indicate the extent of innovation in their teacher education programs since 1961. The modal change reported was "slight to moderate." The development of a model vocational-technical resource center to supplement teacher education programs (Larson, 1965) has prompted little discussion in the literature and no evidence of actual implementation.

The potential of new educational media has prompted research in the general area of teacher preparation. Loughary (1966) suggested that developments in educational media will create a need for several types of nonteaching specialists in schools. Dwight Allen (1966b) described microteaching as an innovative means of providing in-service education. Fulton (1966) developed and tested a checklist for those interested in evaluating educational media programs. In exploring new media for instruction, Payne (1966) reported that there are no theories of teaching that can be applied in using new media because, thus far, research has centered on the behavior of learners and not teachers. Schueler and Lesser (1967) suggested that through new media approaches the teacher educator can provide (a) more efficient observation of classroom behaviors; (b) more efficient self-instruction and supervised practice experience; (c) a direct means of presenting college-level teacher education courses; (d) clearer, more commonly accepted and applicable standards of teacher performance; (e) basic research in teaching-learning processes; and (f) more efficient means of producing teacher competencies. Included with this rather intensive review of new media is a bibliography of 467 entries, many of which are of interest to vocational educators.

The teaching environment is undergoing change, as evidenced by three studies. Polos (1967) built a case for more intelligent utilization of teachers through the dynamics of team teaching. He held that through team teaching better use can be made of the unique talents of different teachers and a more systematic introduction into the profession can be provided for beginning teachers. Smith and Smith (1966) hypothesized that cybernetic principles applied to learning have a great deal to offer, particularly in the area of psychomotor behavior. The traditional instructional time periods are being modified through application of flexible computer scheduling (Dwight Allen, 1966a). The topics of these three studies have considerable potential impact upon the entire question of staffing. By introducing major changes in staffing patterns (team versus individual), revision of approaches to behavioral change and modification of time schedules for instruction, the expected personal characteristics, entry qualifications, and the preparation of vocational teachers could be markedly altered.

Summary

The strength of the current research appears to be its ability to describe rather than to account for various concerns of staffing. Although numerous well executed studies have been conducted, the composite result contributes little to the development of a science of teacher education. The practices and processes of staffing are not sufficiently well understood, nor have they been adequately evaluated.

For the profession to obtain a sharper focus on the problem of vocational and practical arts teacher education, future studies should (a) determine the selective shortages of vocational and technical staff; (b) examine both supply and demand of staff in the context of the social, philosophical, and political aspirations of our society; (c) test antecedent conditions to teaching and consequent status changes; (d) determine the characteristics that are significant predictors of success and persistence in different subject areas and levels; (e) evaluate the influence of various staff utilization plans and curricular innovations on teacher preparation; (f) ascertain preparation requirements of new staff, including occupational experience, subject matter knowledge, and competence in educational technology; and (g) assess the nature of the assignment of staff and needs for in-service education.

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CHAPTER VIII

Program Evaluation

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Two important and significant national studies have been reported since the October 1962 issue of the REVIEW. The Panel of Consultants on Vocational Education (U.S. Department of Health, Education, and Welfare, 1963) criticized the lack of research in vocational education, stating that various rationalizations have been offered over the years for inadequate program statistics. Five years later, the Advisory Council on Vocational Education (1968) underscored the inadequacy of state and national evalutions for understanding what had occurred under the Vocational Education Act of 1963. "Despite the long foreknowledge of the 1966-67 assessment," according to the Council, "no significant studies were undertaken with adequate lead time to produce data for the Council's needs" (p. 45).

Between the publication of these two reports, developments transpired which have not been paralleled in potential impact on vocational, technical, and practical arts education since the enactment of the Vocational Education Act of 1917. Authorization for federal expenditures for vocational and technical education was increased sharply from $56,920,000 in 1964 to $254,460,000 in 1968. Actual expenditures of federal funds were increased from $57,027,000 in 1964 to $233,794,000 in 1966 (Advisory Council on Vocational Education, 1968, p. 33). Of the total expenditures of federal funds for vocational and technical education, approximately $39 million was expended for research, development, and training from 1965 to 1967 under the provisions of Section 4(c) of the Vocational Education Act of 1963.

The increase in authorization of federal expenditures was accompanied by a mandate that assessments be made to evaluate the impact of federal investments on people and programs. The need for attention to evaluation was discussed by many writers, including Arnold (1964), Barlow (1967), Bushnell (1966), and Sweany (1966). The Division of Adult and Vocational Research (1966, p. 79) indicated that program evaluation was assigned highest priority for research supported with vocational education funds in recognition of the impending national appraisal.

The criticism leveled by the Advisory Council on Vocational Education regarding lack of significant studies which could serve as an input to the 1966-67 assessment was tempered by cognizance of inadequate lead time to design and conduct research of the scale needed for program evaluation at the national level. Most of the research produced during the six-year period was either master's or doctor's theses or unpublished staff studies which, generally, did not meet the criteria for inclusion in the REVIEW. The period was not characterized, however, by absence of research activity on program evaluation. Some significant studies, such as the Michigan Vocational Education Evaluation Project (Borosage, 1963), were launched with state funds. Other studies were conducted with funds from the Cooperative Education Act of 1956, from the U.S. Department of Labor, and from foundation support. Several short-range projects supported under the provisions of Section 4(c) were completed in time to be cited in this chapter.

Goals and Objectives

Studies of the goals and objectives of vocational, technical, and practical arts education have been conducted and reported. Their primary emphasis has been on verifying the appropriateness of existing objectives. Perhaps the most widely used research procedure is to submit a list of objectives to a panel of experts with requests to evaluate the objectives in terms of their appropriateness to contemporary needs in vocational, technical, and practical arts education. Value judgments, therefore, have weighed heavily in the assessment of objectives, and when value judgments have been quantified, the resultant appraisals have been confounded with the frame of reference or educational and occupational background of the jury (Coster, Nelson, and Woerdehoff, 1964). Further, objectives have been stated in rational rather than in empirical terms. Rarely have objectives been stated as measurable products involving a component of time.

There is evidence that program planners in vocational and technical education are adopting and/or adapting contemporary systems of planning, budgeting, and evaluation. A report prepared and edited by Kotz (1967) presented the issues in this movement through a series of position papers and discussions, and through a study conducted in six states and 11 communities to determine the status of the planning, programing, and budgeting process. Connolly (1967) summarized the proceedings of a national seminar which was conducted to train state division of education personnel in the application of these techniques.

The area of planning, programing, budgeting, and evaluation is one in which there is lack of evidence that researchers have coordinated their activities with program planners and decision makers. The Advisory Council on Vocational Education (1968) found merit both in the contention that research should not be controlled by operational problems and in the contention that research should focus upon long-range permanent solutions to problems.

The definition of goals and objectives is in effect a social process conditioned by political realities and economic development. The role of research in this area has not been clearly defined for vocational, technical, and practical arts education. But research may be directed toward how goals and objectives may be attained, the extent to which they have been attained, and alternate processes of attaining them.

The Product of Vocational, Technical, and Practical Arts Education

The test of the efficacy of programs of occupational education rests in the performance of the products of the program. A number of studies reported during the past six years have been addressed to this issue. Sharp and Krasnegor (1966) summarized and analyzed 42 follow-up studies in vocational education which they classified as either descriptive or explanatory. The authors did not deprecate the value of descriptive studies, but they did argue for increased attention to explanatory studies. The report also directed attention to the paucity of follow-up information at the postsecondary school level for those trained in technical institutes and junior colleges.

Large-Scale Follow-Up Studies

Two relatively large-scale investigations of the product of vocational and technical education at the secondary school level were completed recently. Eninger (1965) selected a stratified random sample of 50 vocational and/or technical high schools and 50 comprehensive high schools throughout the United States that offered three or more programs of trade and industrial education. Data were obtained from graduates of the class cohorts of 1953, 1958, and 1962. Survey instruments were mailed to 10,758 trade and industrial course graduates and to 3,494 academic course graduates in the 100 schools. The analysis was based on 49.5 percent of returns from vocational graduates and 50.9 percent of returns from academic graduates.

Trade and industrial course graduates of vocational and/or technical schools required 1.7 months to get their first job after graduating from high school, compared with 2.0 months for graduates of comprehensive schools and 2.7 months for academic course graduates. Employment security was higher for vocational course graduates than for academic course graduates. Initial earnings, however, did not differ between graduates of the vocational and comprehensive schools or between vocational and academic course graduates. Earning progression was initially higher for vocational course graduates, but within six years the trend was reversed and the difference favored academic course graduates 11 years after graduation.

The job-related dimension of the study indicated that the first job of 29.8 percent of vocational course graduates was in the same trade for which preparation was received and that the first job of 37.3 percent was in a completely unrelated trade. Graduates of vocational schools were more likely to get their first job in the same trade in which they were trained than were graduates of comprehensive schools. Approximately one-half of the graduates of trade and industrial education courses were employed in the same trade or in a trade highly related to the one in which they were trained. Negro graduates required longer to get their first job, received lower wages initially, had lower employment security, scored lower on job satisfaction, and were less likely to be employed in the trade in which they were trained than white graduates.

In the second study, Kaufman and others (1967) surveyed nine communities in New Jersey, Ohio, and Pennsylvania reputed to have good vocational education programs. Vocational programs in these schools were appraised by a visiting team, and interviews were conducted with 5,181 graduates, 658 employers, and 90 union officials. Teachers and administrators also were interviewed, and questionnnaires designed to measure attitude toward vocational education were completed and returned by 1,600 teachers in 25 schools. The study concentrated on three major issues: adequacy of vocational education, image of vocational education, and vocational education for groups with special problems.

With regard to adequacy, the visiting teams reported that what the schools were doing they were doing adequately. But the schools had failed to develop programs for students who are not able to profit from existing programs, and the proportions of students who had enrolled in vocational programs were less than the proportions of students who obtained jobs after leaving school. Vocational guidance programs were judged to be inadequate, and limited use had been made of advisory committees. Graduates of vocational programs thought they were better prepared for their jobs than were graduates of general or academic programs, but supervisors of employed graduates rated the preparation of the three groups of students about the same. Vocational graduates obtained more manufacturing jobs, while general and academic graduates obtained more white-collar jobs, primarily clerical. Little difference among the graduates of the three curriculums was found for earnings, job tenure, reasons for leaving jobs, and job satisfaction.

With regard to image, the attitude of teachers of academic subjects in vocational schools toward vocational education compared favorably with the attitude of vocational teachers. But in comprehensive high schools, the academic teachers did not express a favorable attitude toward the value of vocational education. Interviews with employers, especially the larger ones, revealed consistent lack of support for vocational education programs. Union officials in the skilled trades were reluctant to give credit for training received in the school program.

The interview data collected indicated that Negroes—especially males—profited relatively more from vocational education than did white graduates. Consistent with the findings reported by Eninger, Negroes received lower income than whites. But the income received by Negro graduates of vocational programs was higher than the income received by Negro graduates of general and academic curriculums, whereas the income received by the white graduates of the three curriculums was approximately the same. There were differences between Negro and white graduates with regard to school and labor market experiences and attitudes toward those experiences, but the differences were not great, especially for the vocationally trained graduates.

These two studies demonstrated a large-scale attack on the study of the products of vocational programs. Not only did these investigations introduce methodologies which may be utilized in subsequent follow-up studies, but also they added to the range of dependent variables—such as length of time required to get the first job, employment security, and earning progression—which may be incorporated in future investigations.

Neither of these studies detected a marked effect for vocational and technical instruction in secondary schools. Controls, however, were difficult to apply, as the investigators pointed out. Had it been possible to control or block more effectively such factors as socioeconomic status and aptitude, the findings conceivably could have been different. Further, these researchers were restricted to graduates, and it is possible that a relatively high proportion of the students who graduated from vocational courses might not have completed high school if they had not pursued the vocational courses.

Explanatory Studies

Edgerton and Sylvester (1966), Persons and Swanson (1966), and Persons and others (1968) utilized multiple regression to investigate variation in selected dependent variables. Edgerton and Sylvester were interested in identifying independent variables that accounted for variance in percent of students who completed manpower development training programs (retention) and percent of students who were placed upon completion of programs (placement). The study included programs in six urban areas. Responses were obtained for 93 independent variables. By stepwise regression, 14 independent variables were identified which yielded a multiple correlation of 0.719, indicating that 51.7 percent of the variance in percent retention could be accounted for by the regression of the 14 independent variables on the dependent variable. For percent placement, six independent variables yielded a multiple correlation of 0.511, indicating that 26.1 percent of the variance in percent placement could be accounted for by the regression of the six independent variables on the dependent variable. Most of the independent variables which accounted for the variance in the dependent variables were related to program organization and program management.

Persons and Swanson (1966) studied the regression of selected independent variables on gross income, net income, and yearly gain in net worth of 528 Minnesota farmers. Enrollment in institutional on-farm training programs and number of years of high school vocational agriculture were not found to be related to the three dependent variables. But the number of adult farmer classes attended during the past five years was found to be related to gross income and yearly gain in new worth. However, other independent variables correlated higher with the dependent variables, and the variables related to education did not increase significantly the percent of variance accounted for in the dependent variables.

Persons and others (1968) investigated the regression of years of participation in "well organized" adult farm business management education programs on selected dependent variables including (a) mean labor earnings, (b) indexed mean labor earnings, (c) mean return to capital and family labor, (d) indexed mean return to capital and family labor, (e) mean total farm sales, and (f) indexed mean total farm sales. The regression of years of instruction on mean labor earnings, mean return to capital and family labor, and mean total farm sales accounted for 51.0, 22.9, and 72.1 percent, respectively, of the variance in the dependent variables. When the indexed values were used as the dependent variables to control for fluctuations in the economy, the relationships were slightly lower. The regression models included only one independent variable and did not parcel out the effect of such variables as increments in size of farm operation and capital investments in the farm operation. But the data did demonstrate that a relatively high proportion of the variance of four of the six variables could be accounted for by number of years of participation in the adult farm business management program.

Moss (1966) approached the study of products of vocational, technical, and industrial arts education differently. In an intricately controlled study, he investigated the effect of senior high school industrial arts training on grades earned in a post-high school industrial institute. The study found that difference in amount, content, and objectives of industrial arts had no observable influence on scholastic achievement of students in four different clusters of postsecondary trade and technical curriculums.

These studies were selected for review in this chapter because they are illustrative of the explanatory type of investigations described by Sharp and Krasnegor (1966). Neither the scale of the study nor the sophistication of design, per se, is a sine qua non of assessment of the product of vocational, technical, and practical arts education. The significance of the problems to be studied, the possibilities of confounding, the need to introduce adequate controls, and the need to parcel out effects that may be attributed to training, however, necessitate increased attention to appropriate design and analysis.

Cost-Benefit Analysis of Vocational and Technical Education

As demonstrated by Kiker (1966), the concept of human capital and investments in the formation of human capital through education, migration, and similar activities has a long and interesting history in the works of economists. Cost-benefit analysis also has a long history in economics (Prest and Turvey, 1966), but, with few exceptions, intensive application of cost-benefit analysis to education as an investment in human capital has occurred primarily during the six-year period covered in this issue of the REVIEW.

There are two major reasons for the recent surge of interest in education as an investment activity. First, large quantities of resources and large amounts of public expenditures at all levels of government are being allocated to educational activities. Second, there is a growing awareness of the benefits of additional education, i.e., its effects on income of individuals and its role in technological change and economic growth.

Investments in education must be evaluated both as a private and social decision because not only does the student invest and receive benefit, but also other members of society bear costs, and benefits may accrue to members of the student's family, his community, and to other members of society (Weisbrod, 1964; Swift and Weisbrod, 1965). These benefits may be either monetary or nonmonetary in form.

Empirical research on the economic impact of education has been directed primarily at determining (a) the effects of educational investments on growth of the economy or of a specific sector of the economy, such as agriculture or manufacturing, and (b) the rates of return, both private and social, to alternative levels of schooling. Since excellent reviews of this work and summaries of major findings are available elsewhere (Bowman, 1966; Schultz, 1967; Woodhall, 1967), the discussion presented in this chapter will be limited to a review of cost-benefit studies of specific vocational and technical training programs. Three studies of secondary and postsecondary programs (Corrazzini, 1966; Pejovich and Sullivan, 1966; and Carroll and Ihnen, 1967) are reviewed. One of these studies, Corrazzini's dealt with both secondary and postsecondary schooling.

The Worcester Analysis

Corrazzini conducted a case study in Worcester, Massachusetts, in 1963-64, and made cost-benefit comparisons among four programs: a regular four-year high school program, a four-year vocational high school program, a two-year postsecondary vocational program, and a two-year postsecondary technical program. Cost estimates were based on school and city records, and estimates of benefits were based primarily on differences in starting salaries of graduates of the four programs.

Corrazzini assumed an annual foregone income of $1,120 for high school students and $2,423 for students in the postsecondary vocational and technical programs. His assumptions, however, were not based on primary data. Rather, he used procedures for estimation developed by Schultz (1960), who, on the basis of census data, estimated that high school students forego the equivalent of 11 weeks of earnings of workers in manufacturing (adjusted for unemployment), and that college and university students forego 25 weeks of such earnings. The sources of downward bias in Schultz's procedures have been discussed by Blitz (1962). Corrazzini assumed private direct costs to be 5 percent of foregone income for both groups of students, or $56 and $121 for high school and postsecondary students, respectively. The annual public direct costs were estimated at $1,210 for boys and $978 for girls for the four-year vocational high school programs. These costs were approximately twice as large as the costs for the regular high school program. The annual public direct cost for the two-year postsecondary vocational program was $1,210, and the annual public direct cost was $1,339 for the two-year postsecondary program.

In a study of the annual public direct costs in eight junior colleges during 1964-65, Anderson (1966) also found substantial cost differences among curriculums. Unit costs for curriculums classified as engineering technologies and industrial technical occupations were 1.95 and 1.52 times larger, respectively, than unit costs for curriculums grouped into a liberal arts curriculum. In addition, Anderson found wide variations among costs of vocational and technical curriculums within and among schools. His data suggest that there may have been considerable variation in costs within the vocational and technical programs that Corrazzini studied, since Corrazzini grouped 11 vocational programs together and four technical programs together. Although Anderson found that vocational and technical curriculums generally are more costly than liberal arts curriculums, his estimates of the ratio of relative unit costs were substantially smaller than those estimated by Corrazzini.

Corrazzini found that the estimated annual salaries of graduates of vocational high schools were $82 to $560 larger than the salaries of regular high school graduates for an unspecified number of students employed in 12 Worcester firms. He assumed that vocational training is primarily a substitute for general on-the-job training and argued that the salary differences he observed would decrease over time and reach zero (in 5 to 10 years) when the graduate of the regular high school program has completed his on-the-job training and has achieved the same level of skills and the same job as the vocational graduate. He concluded that the income gains for a 5- or 10-year period, discounted at either 5 or 10 percent, are likely to be smaller than the additional cost of vocational training, and, therefore, the benefits of the vocational and technical programs are not sufficient to offset the added costs of these programs. However, his conclusions were not consistent with his empirical results, nor were his findings consistent with the findings of other studies of vocational and technical schooling which are discussed below.

If it is assumed that vocational training is a substitute for on-the-job training, and if it is assumed that vocational graduates do not invest in on-the-job training, then Corrazzini's estimate of salary differences is not an estimate of returns but is more nearly an estimate of the initial costs of on-the-job training, which, according to Becker's (1964) hypothesis, are costs which the individual bears through reduction in earnings while he obtains on-the-job training. To obtain an estimate of the return to vocational training, whether obtained through schooling or on-the-job training, it would have been necessary to compare the lifetime income streams of individuals differing only with regard to investments in vocational training. Moreover, all graduates of the alternative training programs should be included in the study. The method of estimating obtained earning data could lead to biased estimates of returns, especially since no attempt was made to adjust estimates of returns for differences among persons in ability and previous investments in human capital.

The Winona Study

Pejovich and Sullivan (1966) attempted to estimate individual private and social rates of return to training in nine instructional areas at Winona Area Technical School (WATS) in Winona, Minnesota. Private direct costs were estimated at $50 per student. Data on private foregone earnings were obtained by a mail questionnaire to persons graduating from WATS from 1960 through 1965 (190 responses) and to trainees enrolled in WATS during the fall of 1965 (169 responses). The private annual return to training was defined as the difference between the WATS graduate's annual full-time earning after taxes and his estimated tax-adjusted earnings if his educational attainment had remained at the level he achieved prior to entering WATS. This difference was assumed to be constant over the work life of the individual, and no adjustment was made for mortality. Pejovich and Sullivan did not provide a clear explanation of their method for estimating the earnings a WATS graduate might have obtained if his educational attainment prior to WATS remained unchanged. Data provided by the Minnesota State Employment Office were used to project post-WATS annual income gains for the trainees since they had not completed schooling and entered the labor market.

Estimates of social or total direct cost were obtained by summing public subsidies (income transfers) to students, public direct costs, and private direct costs. Estimates of total foregone earnings were obtained by not adjusting private foregone earnings for tax payments (income transfers). Social returns were estimated by not adjusting private returns for tax payments.

Pejovich and Sullivan's (1966) results are of considerable interest because they obtained a distribution of rates of return for each instructional area by estimating the rate of return for each graduate and trainee. The median rates of return were high relative to those obtained in other studies, and there is considerable variation in rates of returns among instructional areas. The median private rate of return varied from 11 percent (auto body repair program) to 53 percent (welding program). The median social rate of return varied from 9 percent (auto body repair program) to 36 percent (general office clerk program). The variation in rates of return among individuals within each instructional area was also substantial, ranging from zero percent to over 75 percent.

The wide variation in rates of return among and within instructional areas may result in part from the data used by Pejovich and Sullivan. However, their results provided two useful lessons. First, the potential error involved in generalizing about rates of return to vocational and technical education from the estimated rate of return for a particular program or case study is clear. Second, given wide variation in rates of return among individuals, student advisers and potential student investors in education should interpret point estimates of average rates of return with care.

Gaston Technical Institute Analysis

Carroll and Ihnen (1967) estimated the rate of return, both private and total, to two years of postsecondary technical schooling. Their study involved 45 students who graduated from Gaston Technical Institute, Gastonia, North Carolina, in 1959 and 1960. To obtain a more precise estimate of the effect of technical schooling, only graduates who had not invested in any other postsecondary schooling or formal on-the-job training either before or after graduating from Gaston were included in the study. Also, graduates with military schooling related to their civilian occupation were not included.

Estimates of the direct cost of schooling, both public and private, were based on data obtained from school records and state budgets. Foregone earnings were estimated by subtracting the earnings of Gaston students for part-time and summer employment from the earnings of a control group of high school graduates. Members of the control group were selected by choosing a high school classmate of each Gaston graduate, a classmate who had not invested in any postsecondary schooling or formal on-the-job training, and whose high school grades matched, as nearly as possible, the grades of the Gaston graduates.

Earnings data for the control group members and the Gaston graduates from the time of graduation to August 31, 1964, were used to estimate the initial returns to technical schooling. Thus, earnings data for a period of four to five years were obtained. Regression techniques were used to obtain estimates of the returns to technical schooling net of the effects of other variables related to both quantity of schooling and income. During the first year after graduation, the Gaston Tech graduate earned an average of $555 more per year than the high school graduate earned. This income difference increased at the rate of $160 per year, reaching $1,038 in the fourth year.

To obtain estimates of the lifetime stream of returns, two alternative projections of the initial returns to retirement age (65 years) were made. The first projection was based on 1960 census earnings data by age for Southern white males who had completed high school and one to three years of college. The annual income differences between these two groups (adjusted for a rate of growth of 2 percent per year) were used to approximate the difference between the lifetime streams of earnings of the control group members and the Gaston graduates. The second projection was based on the actual estimated earnings difference between the Gaston graduates and the control group in the fourth year after graduation. This difference, $1,038 per year, was assumed to be the return from the fourth year until retirement. Adjustments for the effects of mortality were made for each projection.

The total cost of two years of technical schooling averaged $7,425 per Gaston graduate, the sum of $2,228 direct cost and $5,197 foregone earnings. The estimated rate of return on this total investment was 16.5 percent for returns projection one and 11.7 percent for projection two. One component of the return to investment in education, increases in fringe benefits, is often not considered. Carroll and Ihnen found that Gaston graduates received more fringe benefits than members of the control group. For example, the Gaston graduates obtained added leisure time through shorter working hours (2.7 hours per week) and extra days of paid vacation and holidays (2.1 days per year). Applying the graduates' hourly wage rates, the value of this leisure time was estimated to be $446 per year. Adding the estimated value of this fringe benefit to the projected returns increased the estimated rate of return from 16.5 to 20.1 percent for projection one and from 11.7 to 16.7 percent for projection two.

The private cost of two years of technical schooling averaged $4,920 per Gaston graduate. Since public expenditures or subsidies covered a large portion of total direct costs, private direct cost was only $770. Gaston students also received income transfers in the form of veterans' education benefits and unemployment compensation, reducing their income foregone to $4,150. For income projection one, the estimated rate of return (before taxes) on private investment was 25.9 percent as compared to a 20.1 percent rate of return on total investment. The estimated private rate of return for projection two was 23.9 percent. The effect of income tax payments on private rates of return was investigated and the results were consistent with those obtained by Hansen (1963). Income tax payments affect both costs and returns and tend to reduce the private rate of return by about 1 percent.

In the Corrazzini study, the total costs (income foregone, private direct costs, and public direct costs) were $7,508 for the vocational program and $7,766 for the technical program. The initial annual income gain ranged from $242 to $720 for the vocational graduate and from $482 to $960 for the technical graduate. These estimates of costs and initial salary gains were consistent with the estimates of costs and returns obtained by Carroll and Ihnen. If the income gains for the vocational and technical graduates studied by Corrazzini were to grow through time at the rate found in the Carroll and Ihnen study, then the rates of return of the subjects studied by Corrazzini would be expected to be similar to those obtained by Carroll and Ihnen.

Few careful cost-benefit studies of vocational and technical education were available. The data required for extensive studies are not being collected currently by public agencies. The few limited studies which have been completed were based on small sample survey data which are difficult and expensive to obtain. The rates of return estimated by Pejovich and Sullivan and by Carroll and Ihnen are higher than estimates of the rates of return for four years of college education (Becker, 1964; Hanoch, 1967; Hansen, 1963). However, little can be said from these comparisons because the rates of return for college education were from aggregate studies based on cross-section data.

High rates of return to vocational and technical training also have been found in cost-benefit studies of retraining programs (Borus, 1964; Page, 1964; Somers and Stromsdorfer, 1964). The methods of analysis used in these analyses are similar to those described in the three studies of vocational and technical schooling. The estimated rates of return are difficult to interpret, however, because much of the income gain or return to training is obtained through a reduction in unemployment rather than through increased wages as a payment for improved skills. Thus, these findings may involve a confounding of the effects of retraining upon unemployment and the effects of education as a long-run investment in increasing the knowledge and skills of the population (Weisbrod, 1962). Finally, the variation in returns and rates of return among alternative programs or curriculums and among students within a curriculum suggests that considerable caution should be used in extrapolating these results to other curriculums, to other time periods, and to other students.

Evaluative Criteria and Accreditation

Pursuant to the mandate for assessment, some state divisions of vocational education have developed evaluative criteria for appraising programs within their states. Among the states that have developed evaluation criteria recently are Arizona, Colorado, Connecticut, Georgia, New York, North Carolina, Pennsylvania, South Carolina, Texas, and West Virginia. Most of the documents are in mimeographed form. Reynolds, Grobman, and McGee (1967), however, have prepared a document published by the Pennsylvania Department of Public Instruction which was designed to be used cooperatively by the state division and local schools in self-evaluation. This publication outlined a philosophy of evaluation and detailed the procedures to be used in conducting the evaluation. One of the major attributes of this document is its flexibility of use.

Byram (1965) prepared a guide to be used by administrators, teachers, and citizens to evaluate local programs of vocational education and tested the procedures in three communities. The publication described in detail how to conduct the local evaluation and included a set of instruments to be used in the appraisal of the program and for obtaining data on the graduates of the program.

Hamlin (1968) prepared a monograph on evaluation which emphasized the role of citizens in evaluating programs of occupational education in public schools. Starting with an analysis of American ideals and values, Hamlin proceeded to outline the major areas in which criteria for evaluation are needed. He also outlined a developmental project designed to test the rationale based on social values. The monograph includes an exhaustive bibliography of publications on evaluation subdivided by topics.

Increased attention was given to the accreditation of programs of vocational and technical education. Dickey (1967) outlined the frame of reference underlying voluntary accreditation, and Nerden (1966) described the activities of the American Vocational Association Committee on Accreditation. Robb (1967) portrayed the need for regional accrediting associations to direct increased attention to occupational education. Stanton (1967) examined 146 accreditation team reports to determine the commendations and recommendations by team members.

The Florida State Department of Education (1968) has prepared a publication to be used in accrediting local programs of vocational and technical education in the state. The publication was developed cooperatively by personnel in evaluation and accreditation and personnel in the state division of vocational education. The system provides for ratings to be assigned to specific aspects of the program according to three specified levels of operation. Four levels of accreditation are proposed, based on the percentage of ratings assigned to the higher levels of operation. The system is being field-tested in 1968 and will be revised and published in final form at the end of the trial period.

Evaluative criteria and accreditation are based on a tacit assumption of high positive correlation between the process and product of occupational education. Value judgments are used extensively in the application of process evaluative criteria and accreditation standards. Although the value judgments are based on experience and expertise, although they are based on the best evidence available as to what constitutes "good" or "sound" programs, and although they provide a motivation for program improvement, they generally are more subjective than objective and they generally do not provide for quantification of qualitative data. There is little or no evidence that the assumption of correlation between process and product variables is valid. This assumption merits the attention of researchers on evaluation and accreditation.

Retrospect and Prospect

The full impact of research on program evaluation resulting from the provisions of Sections 4(a), 4(c), and 12 of the Vocational Education Act of 1963, P.L. 88-210, has yet to be manifested. Investments in vocational, technical, and practical arts education—expressed in such terms as expenditures of public funds, expenditures of personal resources, foregone earnings while pursuing training, and allocation of time (i.e., hours) to training—actually represent a "massive treatment" applied to society and to individuals within the society, the effects of which are expected to result in enhancement of personal well-being, improved conditions of social living, and increments in per capita income and gross national product. The assessment of these effects is the proper concern of program evaluation. But the assessment of a "massive treatment" is exceedingly complex. The treatment consists of a combination of resource inputs on relatively heterogeneous subjects which tends to mitigate against the delineation of controls and the disaggregation of the elements of the "massive treatment."

Throughout the years, the evaluation of vocational, technical, and practical arts education has been more qualitative than quantitative, more subjective than objective, more introspective and impressionistic than empirical, more post facto than a priori, and directed more to the process than to the product.

Many evaluative studies are under way. The Center for Vocational and Technical Education at Ohio State University (Starr, 1967) is developing a model for evaluating state programs of vocational and technical educaion. The model is being tested in three states. Lee (1968) has developed a format and criteria for self-evaluation of state divisions of vocational education, and the instruments and procedures are being tested in several states.

The Educational Systems Research Institute of the University of Wisconsin has launched a large-scale study designed to provide a description of occupational and educational histories of a nationwide sample of graduates and dropouts of vocational and academic programs and of vocational rejectees. The study will involve approximately 15,000 graduates, dropouts, and rejectees from 450 secondary and postsecondary schools and 100 two- and four-year colleges. Additional cost-benefit studies are being conducted in many institutions, including the Institute for Research in Human Resources at Pennsylvania State University and the Center for Occupational Education at North Carolina State University.

As promising as the developments are, the financial and resource commitment does not match the magnitude of the task. Serious study is needed to define the range of variables and measures to serve as the bases for program evaluation. The system for evaluating pilot programs developed by Tuckman (1967) could be extended to the evaluation of programs of vocational, technical, and practical arts education. The move toward more rigorous evaluation has only begun. The next five years not only should, but must, bring forth needed strategies and results.

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CHAPTER IX

The Past Is Prologue

JEROME MOSS, JR.

This has been a special six-year period for research in vocational, technical, and practical arts education. For the first time, because of the passage of the Vocational Education Act of 1963, appreciable amounts of funds were made available for research-development-diffusion activities across the total spectrum of problem areas in the field. The profession began the slow tooling-up process necessary to produce qualitative changes in educational programs through systematic research-related activities; a cadre of qualified personnel was formed and enlarged; the status of verified knowledge was assessed; professional organizations began to take cognizance of the importance of encouraging research-related efforts; and a network of special agencies was created to help stimulate, coordinate, and conduct research-development-diffusion activities.

The total results of these efforts, the ultimate impact on the operation of vocational, technical, and practical arts, need to be assessed. But it is much too early to pass judgment; more time is needed to permit outcomes to manifest themselves. This issue of the REVIEW should not be mistaken for such an assessment. The substantive results made apparent in this issue reflect only one portion of the total output during the six-year period. The purpose and policy of the REVIEW tends to restrict reporting to completed, published research with national, preferably long-range, significance. It therefore eliminated some doctoral studies, research in progress, investigations which supplied immediately applicable information to specific operating programs, most program and course development efforts at the state and local levels, and almost all leadership development efforts. In fact, the studies reported here can be considered only partially representative of that portion of the total research-related activities which provide a basis for potential nationwide programmatic improvements. In terms of funding, about 37 percent of the available federal dollars for research have been spent on this type of activity. As a further restriction on output, federal funding for research has been somewhat erratic, and its influence limited to two or three years of the period under review.

Thus, the primary purpose of the REVIEW is not to evaluate the progress made in the field through all research-related efforts, but to help researchers to conceptualize problem areas and to assist them in selecting more productive problems and techniques for further investigations. Toward this end, a brief recapitulation—a summary of summaries—seems appropriate in order to abstract some major ideas and trends which might provide clues for future research.

Social and Philosophical Framework

At the beginning of the review period, "education as a bridge between man and his work" was interpreted by most educators and legislators as vocational education designed primarily to maintain the manpower supply-demand equilibrium. But, as Ray points out, this interpretation is gradually being revised by a growing proportion of people in the field. There is a heightened sensitivity to human welfare—a sensitivity to people who need skills rather than to the occupations for which skills are needed. Vocational education is beginning to be thought of increasingly as a means of enriching the learning of all students, as experiences for developing a significant portion of each individual's self-concept, and as a potent tool for compensatory education. The primary focus of vocational education is veering from meeting the needs of the labor market toward the development of the individual. One illustration of this trend, and only one of its important implications for research, can be found in the following statement by the Advisory Council on Vocational Education (1968): "Data on supply and demand for various occupations must be made available on a broader and more accurate basis. But total training opportunities must be based, not on the number of jobs which are available, but on the number of persons needing training" (p. 52).

If accepted by the profession, such a revised philosophy would profoundly affect the nature of research in the field by changing both the focus of problems and the nature of appropriate dependent variables. In any event, in the midst of a potential evolution, the field urgently requires careful study by trained philosophers to clarify alternatives and to reveal possible inconsistencies among choices. We are not now getting enough of this kind of constructive attention.

Manpower Supply and Demand

The chapter by Kaufman and Brown provides considerable indirect support for the evolving philosophical position. First, the authors caution against an overemphasis upon maintaining supply-demand equilibrium at the cost of ignoring other desirable social and humanistic outcomes of education. Second, they question the current ability of labor economists to predict demand for specific occupations with sufficient accuracy to warrant basing vocational programs on their forecasts. And third, in light of the expected high rate of occupational change and worker mobility, the authors question the value of attempting to predict the demand for specific occupations. In support of their position, the authors discuss the complex interrelationships affecting labor supply and labor demand, and conclude that we now have too little knowledge about the methodology of prediction, and an inadequate data base, to make anything other than gross occupational predictions for large geographical areas. Consequently, they recommend more theoretical research by highly trained specialists to sharpen the prediction tool, fewer applied empirical projects, and suggest that vocational educators utilize existing manpower information for program planning with great caution.

Career Development

The philosophical perspective of the chapter by Tennyson focuses on the individual, viewing work and education for work as important influences on growth, life style, and fulfillment. The research reviewed helps to explain the processes by which vocationally relevant motives and behaviors are developed. Traditional vocational educators, oriented to satisfying occupational requirements, would be primarily interested in learning about the correlates of success in training and on the job for the purpose of maximizing the efficiency of selection procedures and traineee satisfactoriness. Tennyson is more concerned with utilizing these correlates to improve the individual counseling process and to enhance ultimate job satisfaction. Perhaps more than in any other problem area (with the possible exception of instruction), career development has begun to generate relevant theory and an impressive body of supporting information. Empirical evidence has also been produced which is pertinent to the development of vocational, technical, and practical arts programs. For example, reported research appears to support the need for, and the readiness of students to utilize, occupationally related learning experiences during the junior high school grades. On the other hand, the research also indicates that specialized vocational training during the high school years precipitates a premature occupational choice for most youth, especially in the absence of sufficient occupationally orienting experiences at an earlier age.

Curriculum Development

There is clear evidence that many recent curriculum development projects, as reported by Phipps and Evans, have been influenced by (or are at least consistent with) career development theory and manpower demand evidence. These new curriculums have attempted to identify technical content which is most representative of "industry," or certain groups of occupations, for the purpose of enhancing conceptual understanding and the breadth of eventual applications. Maximizing transfer value through appropriate content selection appears to be the order of the day in curriculum development. Some attention has also been given to the needs of special groups of students and to the use of techniques which free curriculums from such operational restraints as stable class size and fixed length of class period. The problems of curriculum development that remain, however, are manifold. Among the more important is to find efficient tools for empirically identifying occupational competencies and for translating these into properly organized learning experiences. Not only are our present techniques inadequate to deal with technical content (specifically technical information), but they completely ignore the psycho-social elements of the occupational environment. We are just beginning to uncover some of the problems inherent in increasing occupational adaptability; our present attempts to combine "logically" similar technical contents represent a crude beginning that must eventually consider the implications of interactions among the "psychological" organization of content, methodology, personality, attitude, etc. Finally, the need to devise some standardized approach or procedure for correlating or integrating the content from varied fields and disciplines with primary focus upon occupationally related situations is critical to making education more meaningful and relevant for all youth.

Techniques and Modes of Instruction

Although Householder reports considerable experimentation in methods of instruction, the results do not warrant forming new, useful generalizations or recommending widespread applications of innovative practices. We are still faced with basic questions concerning the most effective way to organize content, the proper amount of student direction to provide, and the most appropriate modes of content presentation and student response for various kinds of learning situations. Given the content and purposes of our field, it is somewhat surprising to find that (a) typical criterion learning variables have not been expanded to include attitudes toward work, content achievement in academic subjects, etc., and (b) no attempt has been made to classify learning tasks to permit some generalization of experimental results. In view of our technological potential for individualizing instruction, it would seem particularly important to begin to focus our attention on individuals rather than groups—to identify the relationships among configurations of student characteristics, learning tasks, and learning outcomes, rather than to continue to test for differences among treatment group means.

Organization and Administration

The chapter by Lee and Hamlin represents just the top of the iceberg. Most of the studies in organization and administration probably have had an immediate impact upon program operation, but have either not been published or are highly specific in terms of their application; in either case they are not considered suitable for inclusion in this issue. The reported research therefore appears fragmented. It is also quite subjective and without obvious concern for the development of administrative theory. As the chapter authors imply, too few vocational researchers are knowledgeable about or concerned with administrative problems. There is, however, a growing body of research literature in organizational and administrative theory and in educational administration in particular. We are fortunate that researchers from educational administration are beginning to take an active interest in our problems.

Staffing

Relatively few investigations were reported by Samson whose results established explanatory or casual relationships or which focused on the development of noninstructional supportive personnel. The major portion of the reported research effort in staffing was devoted to descriptive studies dealing with teachers and to the conduct of in-service teacher education institutes. If evaluated properly, the latter could have provided a basis for comparing the "integrated-applied" approach used by most institutes with the traditional "course-by-course" in-service approach, and implications for preservice programs might have been possible. But no such comparisons appear to have been made. We need very much to try to establish a system of verified principles which will permit us to understand and control the teacher education process. At present we are operating programs primarily on the basis of tradition, "conventional" wisdom, and personal experience. This does not imply that current teacher education practices are necessarily bad, only that we really do not know their worth, and that we cannot be reasonably confident about judging suggested means for improving present practices. No doubt there will soon be a rash of studies on microteaching and other applications of educational technology; these are relatively simple to research. What we really need, however, are creative efforts to devise practical, valid means for measuring teacher effectiveness; this is extremely difficult, but without it we lack objective criteria for judging the value of all our teacher education efforts.

Program Evaluation

Coster and Ihnen report that there are inadequate data available for program evaluation. A few large-scale follow-up studies have been attempted. These showed no marked effects for vocational programs, but they lacked the control that would give reasonable assurance of casual relationships. Some small-scale regressional studies were undertaken; the methodology has promise, but so far the efforts must be considered pilot attempts only. Cost-benefit studies are not immune to problems of identifying and measuring individual and social costs and benefits, especially projected costs and benefits. Self-evaluations or expert opinion of program characteristics are the dominant evaluative techniques. They may serve many useful purposes, such as motivating staff and improving community relationships, but as evaluative techniques they can only be classed as acts of faith. The years ahead will demand a great deal of effort and patience, beginning with the identification and classification of the potential outcomes of instruction, if we are to move toward objective program evaluation. The completely unsatisfactory alternative is to remain at our present level of subjective judgment of the educational process.

State of the Art

Just as it is not possible to feel satisfied with what we have been able to learn during the six-year period, it is not possible to overlook the great increase in research productivity in all problem areas since 1962. We have begun to discover the intricacies of our problems and to identify the relevant variables. It is true, and it can be counted as progress, that with each study we raise more questions than we answer. The scope of our concerns is widening. We have, however, achieved no dramatic solutions to persistent problems, and it seems that the reported research has relatively little to offer for immediate use in development efforts. But is it reasonable to expect research answers so soon to persistent problems that have defied solution by all the nonresearch means vocational, technical, and practical arts educators have been able to bring to bear? Research in vocational, technical, and practical arts education is in its infancy. It needs time to mature and, with the help of all educational researchers, to develop the tools—the theory, techniques, and instruments—necessary to solve complex operational problems. The development of these tools is dependent on long-term programmatic research efforts.

Research Policy

One indication of the importance of the potential contributions of research-related activities is the growing concern of both researchers and program operators over the most effective way to utilize research resources. Dialogue within the profession will probably continue for a number of years, with sets of tentative decisions reached at various times in the future about some of the following questions: (a) What is a realistic model for systematic educational change? (b) What should be the relative emphasis given to each function or stage in the change model, e.g., research, operational research, normative development, demonstration, etc.? (c) What should be the priorities for problem areas or specific problems? (d) What voice should researchers, program operators, the U.S. Office of Education, state departments, and professional organizations have in providing periodic answers to questions b and c? (e) What functions should various kinds of research-related organizations and agencies perform? (f) What mechanism(s) should be created to administer research funds?

It is not only necessary that these questions be answered, but it is also important that both program operators and researchers become involved in the discussions leading to answers. The initiation, implementation, and regularization of educational change will inevitably require the cooperative efforts of program operators and researchers at all stages of the process. Both groups must therefore understand the process and each other's role in it. Both groups need to be party to the policy decisions which affect the process in which they are intimately involved.

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Mental and Physical Health

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FOREWORD

This issue of the REVIEW aims to reflect major trends in research on physical and mental health during the past six years. Some of these trends are:

1. A continuation of the emphasis on "positive" mental health, noted in the December 1962 issue of the REVIEW
2. Explorations of ways by which a limited supply of mental health professionals can serve as consultants to help the classroom teacher promote the healthy personality development of children
3. Some exploration of ways of realigning the mental health personnel in the school, including the use of nonprofessionals in school and community mental health programs
4. Continued progress in the development of techniques for identifying the emotionally handicapped
5. A re-examination of the goals and instructional practices in health education.

Chapters on measurement in relation to mental health programs and on sex education research appear in this issue. The changed emphases in mental health programs in the school pose new measurement problems for mental health researchers working in school settings. Increased national interest in sex education has created a need for a review of the research in this area.

The movement to apply public health principles to mental health in education has been an important recent development. A chapter on this topic was planned originally by the REVIEW committee. Unfortunately the manuscript commissioned on this topic was not received. However, Bower cites a number of references in Chapter I that are relevant to the topic. The committee also planned to include a chapter on school and college health services in this issue, but the manuscript commissioned for this chapter was not received.

A vast amount of research is discussed and assessed in this issue. The chairman is grateful to the chapter authors for their comprehensive treatments of their assignments. It is to be hoped that this issue will serve the needs of those who seek research sources in the areas of mental and physical health.

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CHAPTER I

Mental Health in Education

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"Compilation of facts are no more history," wrote Lytton Strachey, "than butter, eggs, salt, and herbs are an omelette." To make a digestible omelette out of the horde of relevant research in the past six years is a valiant task. Therefore the attempt of this section is to identify major trends in content and methodology rather than to cover the entire field. The topics and topic outline of the corresponding 1962 REVIEW will be used. Each topic review will begin with a summary of the trends up to 1962 before detailing the direction of later research. This chapter will therefore consider (a) concepts and research on mental health in education including their interrelationships, (b) ego development in educational processes, (c) mental health factors in school achievement, (d) early identification of children with developing mental health problems, and (e) approaches to the mental health and education of emotionally handicapped children.

Concepts of Mental Health in Education

Basically, the concept of mental health in 1962 was summarized in Johoda's report to the Joint Commission on Mental Illness and Health. It dealt with attitudes toward self, relations to reality, and efforts at mastering one's environment (Johoda, 1958). These were amplified and expanded by Klein (1960), Kubie (1959), Smith (1959), and others.

In the past six years, what Hobbs (1964) called mental health's third revolution has picked up momentum. In this conceptualization Hobbs points to the first revolution which began 170 years ago and was based on the concept that insane people should be treated sanely and humanely. This was the period of Phillippe Pinel in France, William Tuke in England, and Benjamin Rush and Dorothea Lynde Dix in the United States. The second revolution was dominated by Sigmund Freud and his uncovering of what was inside man's conscious and unconscious mind. The present third revolution is the penetration of mental health by concepts of public health.

The necessity for the third revolution is based in part on research by (a) Albee (1959), who placed in evidence the limited supply of people for training in the mental health professions, the increasing demands for

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services, and the inclusion of new and different populations requiring appropriate forms of mental health assistance; and (b) Coleman and others (1966), who showed clearly that equality of educational opportunities and experiences was a long way from actual achievement in the United States. He pointed out that the implementation of this equality would necessitate some radical social and educational modifications. The various skirmishes and minor battles with poverty suggest the need for development of new strategies and approaches in our service programs. The volume of Riessman, Cohen, and Pearl (1964) on mental health in reference to the poor and a book by Pearl and Riessman (1965) on the need to utilize nonprofessionals in human services illustrate a way of extending meaningful job opportunities in schools, mental health, and health and welfare services to fill the manpower gap described by Albee.

What are the specific elements and strategies of the third mental health revolution? Among the contributors to the specification of the nature of this change are Brayfield (1965), Bronfenbrenner (1967), Gladwin (1967), Rae-Grant, Gladwin, and Bower (1966), Smith (1968), and a host of others. Hobbs suggested that this changed conception requires that the mental health specialist be a person of broad scientific and humanistic education who knows something about schools, courts, churches, welfare programs, recreation, cultural deprivation, family life, and human ecology. He must also know how to increase his effectiveness by working through and with the people in such programs. Smith (1968) feared that the third mental health revolution would be resisted by incorporation—that is, confinement to existing models while lip service is given to new ideas—and was especially fearful of such an outcome in community mental health centers. Rae-Grant, Gladwin, and Bower (1966) saw the possibility that the third mental health revolution could go too far, rooting out the good along with the bad. They questioned whether the service professions, including teachers and school personnel, could indeed help the poor or whether these professions would be replaced by new kinds of service personnel.

Mental health professionals must recognize that the era of the easy sell is over. Gladwin (1967) reported a small conference concerned with changes in the goals and practices of clinical work in mental health. The group suggested that such practices should develop concepts of intervention based on increasing social competence and should teach those middle class skills and perceptions which are essential to the opening of employment and educational opportunities. The conference defined such competencies as (a) the ability to learn or to use a variety of behavioral responses to reach a given goal, (b) the ability to use a variety of social systems and utilize the resources they offer, and (c) the ability to test reality both cognitively and affectively. Bower (1967a) has detailed ego processes leading to social and individual competency and incompetency: (a) ego processes mediate data, (b) effective processes manage information so that objects, events, and feelings can be differentiated and reproduced with good fidelity, (c) heavy or light inputs can be paced, and (d) new inputs can be integrated by the individual and used to expand concepts.

According to Brayfield (1965), the goal of psychology as a profession is the establishment and maintenance of the effective performance of the members of society in their roles, relationships, and required tasks. Human effectiveness, he said, is the target of the task. He cited the work of Phillips and Zigler (1961), who have developed indices and definitions of social competence along a social-effectiveness continuum. Brayfield also suggests that psychologists ought to provide more active leadership in the field of education, thus providing a natural source of cultural support in the development of effective persons.

Concepts of Education in Relation to Mental Health

As detailed in a previous REVIEW (AERA, 1962), education's task in relation to mental health is to find ways to get all children through the educational process as effectively as possible. The earlier REVIEW pointed out several studies confirming the fact that effective passage through this social system is critical for children.

Three books review and reinforce much of the research relevant to this section. Cowen, Gardner, and Zax (1967) reviewed and expanded emerging approaches and programs in mental health, including mental health in schools. Sarason and his associates (1966) described mental health in schools as seen by personnel in a psychoeducational clinic in a Department of Psychology. Bower and Hollister (1967) presented a variety of conceptual models for mental health programs in schools supplemented by a description of what they considered some of the better approaches. In his chapter, Bower (1967b) discussed competence in the use of symbols as the prime objective of education and mental health. The ability to use symbols, he said, gives us conceptual and denotative accuracy in assigning meaning to objects, events, and feelings. Symbols also give us the ability to sleep and dream, thereby connecting primary or nonrational modalities of thought with secondary or rational modalities. Hollister (1967), enlisted the concept of "strens" to describe educational experiences that strengthen growth and personality as opposed to trauma which describes experiences which injure personality. In the same volume, Sanford (1967) reaffirmed the notion of education as a matter of transmitting symbols. He considered the relevancy and impact of educational interventions on the development of imagination, ego, maturity, health, and mental health. Included in the same volume (Bower and Hollister, 1967) are contributions by Kubie on preconscious functions in education, Thelen on the impact of the group, Donald Klein on consultation processes, and Lippitt, Fox and Schmuck on the substance and process of research in developing innovative classroom practices to support achievement and ego development in students.

Among the emerging approaches presented in the Cowen, Gardner, and Zax volume (1967) was one by William Klein (1967) describing the initial program to train human service aides which was developed at Howard University. Klein became aware that the assumption that youth aides cannot grasp some of the more subtle concepts upon which their work is based is an erroneous one. He found that one group being trained for work as counseling aides in welfare institutions was quickly caught up in and could understand questions of institutional roles, the effects of institutionalization, staff morale, and high recidivism rates.

Pearl and Riessman (1965) stressed that education must ultimately become the United States' largest enterprise and must provide new roles, such as teacher aides, as well as other work opportunities. In effect this would enable the indigenous poor to become part of the system of learning and instruction.

Mental Health Within the Context of Educational Processes

Bower (1964) considered mental health aids in the schools to be those pupil personnel and curriculum programs which help the school carry out its objectives for each child. Biber (1967) presented the goals of education as (a) sensitivity to the world around one, (b) the development of techniques and attitudes for learning by discovery, (c) the development of cognitive power and intellectual mastery, and (d) the support of the synthesis of learning through opportunity for symbolic expression.

In terms of mental health workers helping teachers carry out these goals, Sarason and others (1966) reported that teachers want and need a type of concrete help which sees the child in the context of the class. They described the work of the psychoeducational clinic at Yale and the activities of consultants in supporting and enhancing the work of the teacher. Newman (1967) reported on a method of psychoeducational consultation at a variety of schools at a variety of levels. She found that comprehensive consultative services are a useful way to create a healthy climate for learning in the schools and that such consultation works if it comes from (a) an agency administratively separate from the school, (b) a group specifically hired by the school system to do the job, or (c) an in-school group trained by an outside group. Newman also presented two diaries of first-year-teachers and illustrated the results of consultation services on them.

Mental health consultation as one of the useful services of prime importance to teachers has also been examined by Berlin (1967), Caplan

(1964), Donald Klein (1967), and others. Caplan described types of consultation, such as client-centered case consultation, program-centered administrative consultation, consultee-centered case consultation, and consultee-centered administrative consultation. Caplan pointed out how consultants can anticipate and avoid being asked to do psychotherapy and avoid other pitfalls in this supporting relationship. Donald Klein described group-oriented consultation, including the use of sensitivity training groups. Berlin described the therapeutic effect of learning and how a consultant can be helpful through (a) providing information, (b) providing interpretive help to the teacher on what is happening in the classroom, (c) clarifying the integrative part that learning may play in the child's life and in the reduction of his troubles, (d) helping the educator preserve his own mental health in the face of the pressing mental health problems of his students and their parents, and (e) helping the teacher recognize his feelings of despair, anger, hate, and guilt which arise from an incapacity to love or teach all the children.

Mental health in relation to education involves research on how to make the educational experience successful for all children. One method is consultation of mental health professionals by teachers and other school personnel. Another method is collaboration between teacher and pupil personnel worker in exploring school-related interventions. Lambert (1965), using Hollister's concept of "strens," presented a model which teachers and pupil personnel workers can use together. For example, she conceptualized the nature of interventions on the basis of planning as (a) specific activities for children who are subject to or threatened by stress which can be modified or eliminated, (b) specific activities for children who need to be isolated from stress which cannot be modified, (c) specific interventions for children already affected by stress for whom the school needs immediate mental health first aid, (d) interventions that build personality by increasing psychological safety, (e) interventions that reinforce personality strength, and (f) interpersonal and group interventions that assist in relationship building. Lambert's model makes it possible for teachers and other professional school personnel to plan curriculum and system-related changes on the basis of a rationale which combines educational and mental health considerations.

Ego Development in Educational Processes

All of man's symbolic skills—his primary and secondary processes of thinking and conceptualizing—are managed by and through ego processes. Ego processes are mediators of data from the inner and outer environment. Bower (1967a) described the relationship of educational processes to ego processes as involving the functions of organizing, binding, and feedback. He illustrated several specific education-enhancing ego processes including the kinds of curriculum experiences which might be useful in building such personality functions.

Murphy (1961) enumerated positive ego processes as coping mechanisms. She described such mechanisms as balancing the individual's instinctive strengths with his social strengths. These mechanisms are evident in such behavior as perceptual clarity, motor tension release, distribution of energy, ability to accept limits, and resilience in mobilizing resources under stress. Kroeber (1963) compared the characteristics of defensive ego behavior with coping ego behavior and identified 10 ego mechanisms: discrimination, detachment, means-end symbolization, selective awareness, sensitivity, delayed response, time reversal, impulse diversion, impulse transformation, and impulse restraint. Using operational definitions related to each of these ego processes, Kroeber found that ratings of ego mechanisms from tapes could be used to predict an individual's response on the *Rorschach*.

Another aspect of research on ego processes comes from the increasing information about sleep initiated by Aserinsky and Kleitman's (1953) discovery of a distinct existence during sleep highly associated with optical stimulation and vivid, detailed dreams. Follow-up research detailed by Snyder (1965) suggested that dreaming is a form of consciousness that consumes about 20 percent of adult sleeping time. Dement (1966) has shown that these dreams or rapid eye movement (REM) states in sleep are obligatory in that if these dream states are prevented from taking place the deficit is made up in a highly quantitative fashion. Snyder asks what adaptive functions the REM state serves and why it persists in man. A book by Luce and Segal (1966) suggests that REM states are necessary as a rendezvous and central clearinghouse for all symbolic activity experienced by the ego and as an opportunity to connect ideas and symbols emanating in primary (nonrational) thinking processes with ideas and symbols derived from secondary (rational) processes. It is interesting to note that REM sleep deprivation occurs in some states of mental illness and, according to Snyder (1965), this significantly alters brain function.

Mental Health Factors in School Achievement

The 1962 REVIEW on mental health (AERA, 1962), emphasized research on the relationship between educational skills, such as reading and arithmetic, and the ability to concentrate and to manage anxiety and stress. To a great extent this research continues, with emphasis on two disenfranchised groups—the college student and the poor.

Deutsch (1963) detailed the lack of school skills in lower class children which makes failure almost inevitable. This deficiency results from a lack of both the formal or behavioral operations by which stimuli are perceived, encouraged, or responded to and the actual lack of content in the child's knowledge and experience. Research has emphasized the importance of adult-child dynamics in learning and the lack of encouragement and ability of lower class children to use adults as a source of information or as a mediational, conceptual base.

Other findings of the Institute for Developmental Studies as reported by Riessman (1964) are that deprived children appear to be poor in the use of verbs but better with descriptive adjectives, they seem to understand more language than they speak, and they express themselves best in spontaneous, unstructured situations. Bernstein (1966) asked whether we know what kinds of social relationships generate what kinds of speech systems. He found that members of the lower class use a restricted code in which the assumptions common to the speakers reduce the need to elaborate verbally. In restricted codes speech is fast, articulatory clues are reduced, and meanings are condensed and specific to the relationships. There is also a low level of vocabulary and syntactic selection.

The Ausubels (1963) documented and summarized factors in lower class children's nonachievement in school. When the educational and vocational aspirations of Negro boys and their mothers were compared to White Protestant Americans, French Canadians, American Jews, Greek Americans, and Italian Americans, the mean vocational aspiration score of the Negro group was significantly lower than for all the other groups except the French-Canadian. However, 83 percent of Negro mothers desired a college education for their sons. Clark (1963) commented strongly on the erroneous assumptions on which the Conant (1961) report was based—namely the idea that American education should gear itself to train more efficiently "the hewers of wood and the drawers of water" while providing effective academic education to an intellectual elite.

Although much research is being done in the area of school achievement for lower class students, the implementation of such research in the development of comprehensive school programs in the large cities is still on the horizon.

Early Identification of Children with Developing Mental Health Problems

A detailed summary of past research and research trends was summarized by Lambert (1967). She pointed out the problem of using diagnostic labels which have little operational utility or consensus and also presented follow-up studies of attempts at early identification of children with developing mental health problems. Long, Morse, and Newman (1965) reviewed seven studies on early identification and Zax and Cowen (1967) summarized work in the Rochester City Schools. All studies strongly supported the notion that teachers gather enough information about children in their routine teacher-student interaction to make highly accurate predictions of a child's progress or lack of it in school. In another study, however, Goldfarb (1963) asked teachers to rate children and then compared the ratings to a sample of the rated group seen by psychiatrists in a 50-minute interview. There was a marked lack of agreement between teachers and psychiatrists in classifying children with adjustment problems. This research has all the conceptual problems of the old Wickman-type studies plus the assumption that a psychiatrist in 50 minutes can be a more effective predictor of behavior than a teacher. A study by Cohen (1963) compared the predictive ability of a teacher, a psychologist, and a child psychiatrist in judging which kindergarten children would learn up to their potential in the first grade. The teacher taught, the psychologist tested, and the child psychiatrist played with the children. All three did a good job in predicting, but the teacher did the best. The psychiatrist, who predicted a greater degree of underachievement than actually occurred, suggested in explanation that some of the observed clinical anxiety which he expected to lead to underachievement actually produced overachievement. This investigation, along with others, confirmed Robins' (1966) study that raters in general are better at judging positive achievers than poor achievers and that teachers' judgments can provide an economical and efficient guide to the prediction of a student's school success.

In the area of preschool screening, Klein and Lindemann (1964) described six experimental programs: the Junior Kindergarten Program at UCLA, the Human Relations Service of Wellesley, the Sumter County (South Carolina) program, the California In-School Screening, the South Shore Guidance Center, and the Preschool Mental Health Screening Project of the Alabama Department of Public Health. Bower (1960) has also brought much of the research and conceptualization up to date.

College Mental Health

Student unrest on campuses both here and abroad over the last five years has focused interest on the campus as an environment and on the stresses inherent in its ecological structure. Also spurring this interest were newspaper reports of increasing percentages of emotionally impaired students over the period 1958-64. These statements were verified in a study of one university by Weiss, Segal, and Sokel (1965).

Attempts to isolate sources of stress within the campus environment were given impetus by Stern, Stein, and Bloom (1956) when they applied the concept of "environmental press" to the prediction of human performance. Pace and Stern (1958), using this concept, created the *College Characteristics Test*—a test for assessing characteristics of a given college environment. More recently, studies by Musselman, Barger, and Chambers (1967) and Wright (1964) have attempted to measure student needs, sources of stress, and releases from stress on individual campuses.

Attempts to deal with emotionally damaging stress on the campus, as in some other fields of education, have led to preventive techniques. Focusing on public health concepts of primary and secondary prevention, Barger (1963), Kysar (1966), and Whittington (1963), among others, have outlined programs for preventive psychiatry on the campus. Barger suggested that prevention should be combined with some sort of short term treatment, possibly based on Gerald Caplan's "crisis" model. Jacobson (1965) has reported effective use of this strategy, although not with college populations.

A recent national conference and several regional conferences held by the U.S. National Student Association have outlined several sources of college stress. Shoben (1965), in reporting on the national conference, outlined several persistent situations viewed by participating students as stressful: (a) lack of student-faculty and student-administration direct and informative communication; (b) because of this lack of communication, a sense of dealing with adversaries within the campus community; (c) the lack of relevance to life of much of the educational experience on most campuses; (d) a lack of student participation in campus decisions directly concerning them; (e) the necessity of a commitment, now missing, on the part of colleges to view the individual as the basic element of value in the educational process; and (f) increased competitiveness and depersonalization of the campus atmosphere.

The third point in Shoben's recommendations has received much attention in recent years. Harrison and Hopkins (1967) presented a plan for cross-cultural living for overseas workers. Chickering (1967b) has shown that planned institutional objectives can affect the path of development of college students. Chickering (1967a) also points out that the development in an individual student of a personality factor, such as autonomy, is the product of many environmental factors within the campus.

Psychoeducational Approaches to the Education of Emotionally Handicapped Children

The research trends in the correction of the emotionally disturbed as described by Hollister (1959) in the 1962 REVIEW have advanced on all fronts. These fronts were (a) increased confidence in the school group for helping disturbed children, (b) use of teachers as chief dispensers of mental health programs, and (c) more imaginative use of varieties of school-related programing to help such children. Some two dozen programs were described by Bower and Hollister (1967); Cowen, Gardner, and Zax (1967); Long, Morse, and Newman (1965); and the 1965 Yearbook of the National Society for the Study of Education (NSSE, 1966). These include such programs as Project Re-Ed, the research by Donahue and Nichtern (1965) on the use of teaching moms, the use of college and high school tutors, a camp program by Loughmiller (1965), Hewett's programs at UCLA (1964), and Morse, Cutler, and Fink's (1964) study of special classes in the United States.

As the business of America becomes more and more a business of educating all children, increasing research emphasis will be placed on finding ways of helping the most difficult, deprived, and disturbed.

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CHAPTER II

Innovations in School Mental Health Programs

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Eventually school mental health programs will include comprehensive primary prevention as well as rehabilitation, both monitored by systematic evaluation. After the fashion of the community mental health approach, the elements will be built into the ongoing educational process rather than added on. Regardless of the panaceas of the moment, we can anticipate a combination of traditional approaches with newer techniques. The new mosaic has yet to be created, though Biber (1961) gave a thoughtful base and Rhodes (Chapter IV) touches upon the issues involved.

Part of the complexity rests with the recognition of the profound interaction among school, family, and community forces as a life system (Bower, 1968). Several authors have considered the nature of overall models. Cowen, Gardner, and Zax (1967) saw school programs as one aspect in their emerging approaches to mental health. In this volume, matters of general theory were related to detection and prevention, the teacher's role, and specific action programs including the use of subprofessionals. It was a broad-gauged source book for serious practitioners with a combination of theory and practice. Sarason and others (1966) also considered generic issues and a "clinic in the school" operation in depth. Awareness of the total system is evident in the attention given to management, authoritative support, and movement from concepts to action. A third approach was taken by Long, Morse, and Newman (1965): the concentration was on identification, school programs, management, and teaching the more disturbed child, with selections on the nature of improvement and research evaluation. Lambert (1964) compiled a useful set of papers which included attention to primary prevention and ego-building processes in school mental health.

Greenwood (1968) described two mental health models, one for the 10 to 15 percent of the population having serious difficulty, the second for the total population. Crisis intervention, seminars for school personnel, diagnosis and consultation services, special classrooms for disturbed pupils as well as "teacher-moms" were advocated for the clinical cases. Greenwood envisioned more attention to feelings in teacher training and in-service training for all staff as a channel to serve the mental health needs of the total population. Hunt (1968) saw the school as the logical focus for a national mental health program because it provides access to the entire child population. He included identification and treatment, with the status and authority of the school system as vital enabling conditions. Bower (1961) developed a basic position for primary prevention in a school setting with an action program. The research on the index for children showed that it is possible to differentiate mental health status using intelligence, achievement, a self-perception inventory, peer perceptions, and a teacher rating. This was a sophisticated approach and required training for the teachers.

The present review will cover the search for new guidelines for school mental health efforts, the function of the teacher, new styles of effort for mental health personnel, services focusing on pupils, and approaches directed toward changing the school milieu.

The Search for New Guidelines

Critics have questioned the lore of school mental health: love is no longer the sine qua non. The convenience of blaming all on the teachers is past. Ausubel (1965) is one of the vigorous voices raised concerning various mental health functions of schools, particularly the idea that permissiveness is desirable. He asked colleges to terminate the "conspiracy of silence" which has made teachers feel guilty and responsible for all classroom problems. After reviewing various possible roles, Ellis and others (1968) also indicated the need for a more realistic support for teachers on the part of elementary counselors. Caplan (1963) introduced the theoretical approach of crisis intervention in keeping with the confrontation psychology of today. He advocated helping children at that point and time when they are unable to cope successfully. Many would agree that the traditional approaches fall far short of meeting current school conflicts—conflicts so severe that in many instances they have threatened the very possibility of operating schools. In this connection Bardon (1963b) saw the school mental health program as a product of the unique social structure of each particular institution and as dependent upon the relativistic nature of the definition of mental health itself. Baker and Wagner (1965), after reviewing the literature, found that schools in lower socioeconomic levels had relatively more mental health problems. Robbins, Mercer, and Meyers (1967) indicated that such particulars as the attitude of the principal and size of the school had an impact on who was referred. The upshot of these studies was that no single model emerged as suitable to all circumstances.

A masterful review by Glidewell and Swallow (1968) of the prevalence of maladjustment studies should be examined by all school mental health workers. They reported the information from specific researchers, but went further and synthesized and related the information gathered since 1922. They stated that 35 percent of all schoolchildren had some difficulties and that 10 percent had difficulties serious enough to require clinical attention. Glidewell has provided up-to-date reinforcement for the need for new solutions to meet this impressive problem. The variation in the problems obviously requires more prescriptive remedies than the general consultation or therapy provisions usually anticipated.

The Classroom Teacher as Mental Health Worker

With the evidence regarding the magnitude of the school mental health problem, no one seriously expected available specialists to stem the tide. In addition to the numbers, there was also the emergence of the concept that the significant help must be provided in the action setting as part of the ongoing educational process. Can teachers be trained to assume this role, if indeed the role can be defined? The general elements of teacher training programs were discussed by Cowen, Gardner, and Zax (1967) and by Morse (1968) specifically for high school teachers. The latter stressed the teaching difficulties which have resulted from the presence of external social press in the classrooms.

The course approach to teacher mental health training was less than convincing, although courses were shown to influence verbal statements of attitudes to make them coincide with the statements of clinicians (Pinckney, 1962). A more promising method advocated by Harris (1961) incorporated a correlated course and demonstration teaching in an ongoing multidiscipline clinic where diagnosis is made and treatment given. Balow (1966) advocated a combination of didactic internship experience and T-group for self-understanding. He found that the T-group had the greatest impact in developing sensitivity. The candidates shifted to a more realistic view about pupils and were judged by supervisors to be high in ability to relate to difficult pupils. Wood (1968) described the use of planning teams where the educator plays a major role in moving from diagnosis to prescriptive education.

One may suspect that the teacher's mental health role will not be met by academic courses because the problem is not one of understanding a responsibility. The problem is rather in meeting a recognized responsibility in the face of many erosive conditions such as those enumerated by Newman (1965). Recent work emphasized the importance of keeping the teacher on a positive emotional track. While Amidon and Simon (1965) indicated that the exact nature of pupil-teacher interaction is difficult to specify, Rosenthal and Jacobson (1968) demonstrated the power of teacher expectations. In an experimental situation they found that teachers' behavior toward pupils was considerably influenced by what they were led to suspect concerning their pupils. It was a special case of self-fulfilling prophesy in interpersonal relationships. We cannot afford to have teacher attitudes contaminated by false expectations or defeatist opinions. This is particularly critical with lower class children. Howard (1968) found that public school teachers in lower socioeconomic urban areas were rejecting in their attitudes toward lower class children. His evidence also indicated that teachers do not appreciate the problems which are most important to lower class children. Rather, teachers misperceive, thinking that the locus of problems is more frequently in the home and not in the school environment. For this reason, several later sections will be devoted to operational steps.

One prevalent approach to helping the teacher with mental health responsibilities has been through consultation, and some new concepts have been introduced beyond the traditional information giving and advice on pupil dynamics. Sarason and others (1966) concluded that teachers lack preparation in how to use consultants just as mental health workers lack training in appreciating classroom problems. They stated that teachers need help in management of children, in changing their perception of the problem, and in releasing their feelings. They added that they should be given authoritative support. Their method of consultation was through an in-school psychoeducational clinic.

Since the teacher is a prime mental health resource, Chaplan (1966) proposed that the psychiatrist give a combination discussion-lecture course to teachers dealing with practical problems. The value of the course was evident since in no case was it necessary to remove any of the 900 pupils involved even though each teacher had been trying to exclude one or two pupils from class before the course. The school psychologist was seen by McDaniel and Ahr (1965) as the logical resource person and in-service educator.

A new procedure has been advocated by Wilmeth (1967): it consists of a small group in which each teacher focuses on one student, reports sample behavior to the group, and, after discussion, translates the needs into action by changed curriculum and interaction patterns. Mariner and others (1961) reported that 60 percent of the school personnel saw group psychiatric consultation as stimulating, meaningful, and beneficial. In contrast, Gluck (1963) advocated a systems analysis approach to discover the appropriate areas where school personnel themselves could undertake action to achieve a proper mode of consultation. Continuing in this vein, Newman (1965) demonstrated that psychological services could help a school assess its own needs and eventually provide its own services. Oldridge (1963) advocated case conferences in place of psychotherapy in the school. Lawrence, Spanier, and Dubowy (1962) saw school consultation as a basic cornerstone of community mental health center work.

Newman's (1967) volume described in detail the theory and practice of on-the-firing-line consultation in a wide variety of difficult settings and age levels. The goal was in contrast to the usual support offered teachers since emphasis was on teaching them skills and actual techniques. This work was an important addition for those seeking new ways to work in very difficult schools. The diary of the new teacher reported in this volume is a study in the coercive force of negative teacher peer group pressure. In place of just adding consultation to an infected system, the concept of primary prevention should be applied to the system itself. While there was still too much advice giving and role taking in consultation, there was also a clear break toward a more realistic concern with the causes of teacher frustration.

The Realignment of Mental Health Personnel

One source of new school mental health programs is through a redeployment and augmentation of present mental health personnel. In addition to supportive service for the teacher discussed previously there are new theories and new roles regarding service to children.

Abrahamsen (1959) found that private schools reported slightly more emotionally disturbed pupils (11.7 percent) than did public schools (10 percent), but that discussion of such problems was twice as frequent in private schools (43 percent) as in the public schools (20 percent). The need for mental hygiene staff was met to a greater extent in the private schools (66.6 percent) than in public schools (18.4 percent). Although greater awareness of difficulties resulted in a higher possibility of service, the figures revealed how short mental health manpower really was in the schools.

What should the school mental health personnel be engaged in doing? Should it be diagnosis, therapy, supporting the teacher, or changing the system itself? Interestingly enough, some who would object to classical treatment in the schools do not object to operant methods. Others are more concerned about who is engaging in "therapy" than in what form the therapy takes.

Szasz (1964) opposed psychiatric treatment in schools, while Reger (1965) took a contemporary educational position that public school problems be handled by school personnel rather than by psychiatrists. There was increased awareness on the part of psychiatrists of their need for experience and training in educational processes (Liss, 1966) with an aim toward real collaborative planning. As learning problems are incorporated in the mental health regimen, pediatricians are assuming a more vital role in supportive consultation (Sands, Frostig, and Horne, 1964).

School psychologists have been most sensitive to the need for innovations. Bardon (1963a) saw primary and secondary prevention linked, with the school psychologist at the hub, in making the total milieu a rewarding and beneficial one for the child. Gray (1963) followed suit and outlined the role of the school psychologist as "data-oriented problem solving" and "working through others,"—a far cry from sleuthing IQ's. There was more evidence of a change of stance in Ellis and others (1968) who felt too much emphasis had been put on personal dynamics of youngsters and general attributes of teachers. He asked the counselor to use the latest methods in behavior changing and educational programing.

Oxhorn (1965) described a psychology—social work—education troika for early prevention of both emotional and learning difficulties. Evaluation of the program was underway. There was an awareness among the mental health service professions that they must seek a new pattern for providing help if they are to become a viable part of the school.

One thing is certain for the future of mental health work in schools as well as in other settings: each professional worker will have one to three subprofessional persons working with him. This will be true of the teacher, school social worker, and the school psychologist. But as inviting as this is, there will be difficulties since subprofessional workers do not want to do the menial tasks any more than anyone else does. It is easier to embrace the concept of indigenous workers than to accept them as partners.

Birch (1963) reviewed the place of the nonprofessional worker in rehabilitation and special education, covering all areas from selection and training to utilization. Tolor and Lane's (1968) specific program of crisis intervention employed lower class subprofessional persons with the major emphasis on immediate, short-term, time-limited treatment. One of the most noted subprofessional efforts was the "teaching-moms" utilized for severely disturbed youngsters. The psychiatric school team of Nichtern and others (1964) maintained that this therapeutic process had dramatic effects. Fenichel (1966) criticized certain implications made by these authors and stated that in reality the program's effects resulted from the one-to-one nature of the design for children with less severe deviations.

The lack of flexibility of present professions to adjust to school mental health needs provoked two new specialists to bring the services closer to the classroom. Levine and others (1965) saw the new child development specialist as an in-school resident consultant. This program frequently anticipated change in the school operation and curriculum as well as providing opportunity for case conferences. The crisis or helping teacher was another new role. In this project the pupil became the temporary student of the specialized teacher at the time of his academic failure and/or acting-out behavior in the classroom. This teacher combined academic and behavior support to help the child resume his regular class as soon as it was feasible. Through offering direct service, the crisis teacher became a key mental health agent (Newman, 1965).

The issue of school versus mental health agency cooperation and differentiation continued. Landy and Scanlan (1962) saw the school functioning on the ego level while the deeper "love" levels are left to the psychotherapist. The fact is, interagency collaboration is very difficult to achieve. Reinhold and Farragher (1967) described a program of multiple services and foster homes to enable seriously disturbed children to be maintained in their own community. The arbitrary distinction between therapy and education continues to provoke discussion. Mullen and Blumenthal (1962) planned schools for the disturbed as "educational" agencies with an extensive high level program leaving the therapy to other agencies.

The net result of developments in mental health personnel is that a teacher can anticipate more support from new types of school mental health workers as well as new attitudes of general mental health professionals.

Services Focusing on Pupils

Whatever the links in the chain, the ultimate focus of the school mental health effort was always the same: the pupil. The first matter was one of identification of those pupils in need of assistance. Then program innovations were examined, with particular attention paid to high risk pupils in whom teachers invested great effort, often with low return.

Identification

Identification sources include the child himself, his peers, the regular school personnel, parents, and specialized personnel. Data from these divergent sources are seldom in concert except in the extreme cases. For example, pupils are more concerned with vocational and out-of-school problems, teachers emphasize school success, clinicians are attentive to inner states, and management personnel see the surface overt behavior. To help the teacher objectify responses and use the school sources of information, the Bower-Lambert (1961) devices provided separate schedules for pupil self-perceptions and those of peers and teachers. Separate forms enable the screening of all school-age children. Considerable effort was given to validation. Though the teachers' ratings depend upon intragroup distinctions and the schedules are somewhat expensive, this represents a significant step ahead in making systematic use of school-available data sources for designing mental health programs.

Fisher (1967) found that the Kauthe projective technique, using the placement of family figures, distinguished the disturbed from the normal boys. Quay and Peterson (1967) developed a teacher rating scale which offers a three-category diagnosis: aggressive acting-out, neurotic, or immature. The advantage of this scheme is that Quay incorporated unique plans to provide specialized educational programs for the various types. Vinter and others (1966) have designed a one-page check sheet with dimensions which are especially school relevant: classroom conduct, motivation, emotional state, teacher dependency, and personal behavior. Pimm's (1967) modification of the Quay scale was used to screen children for referral to special services. Both Gordon (1966) and Coopersmith (1967) reported simplified self-concept questionnaires. Gordon also discussed the total study of the child while Coopersmith provided a penetrating discussion on the significance of his research on programs designed to enhance self-esteem. A significant self-image and school adjustment study of adolescence was published by Rosenberg (1965). The negative interlocking implications of low self-esteem and academic and social life in school are only too clear. The most sophisticated comprehensive discussion of self-concepts and related research was published by Diggory (1966).

Examples of early case findings increased (Cary and Reveal, 1967; Westman and Ferguson, 1967; Westman, Rice, and Bermann, 1967). A record of two of the most thorough action and research efforts can be found in works of Cowen and others (1963) and of Schiff and Kellam (1967). In these efforts early detection and prevention were the goal. Positive potentials were uncovered, and broad spectra of interventions designed, including work with parents. An often overlooked aspect in screening has been the nature of the most serious multiple problem cases. Chazan (1965) has shown that physical defects, family difficulties, and inadequate discipline tend to accumulate, making school case findings only one part of the total picture of the disturbed child. A significant research by Stott (1966) used the 10-category *Bristol Social-Adjustment Guides*, and the results indicate the presence of biological factors. He did not see evidence for the popular notion of *general* maladjustment being a reflection of an *inadequate* subculture adjustment as has been proposed heretofore. The Stott volume is an important one for school mental health planners.

Other problems relative to school mental health assessment required attention as the school and community agencies moved toward some integrated concern about the mental health of our children. In many places there was, on the part of lay persons, growing community resistance to investigations of mental health status since this incorporated value judgments about behavior (Porshansky and Evans, 1963). The school has been given increased responsibility, but that very fact poses a threat which will increase if schools become the mental health center that Stickney (1968) suggests they will. At the same time, the psychologically oriented professional groups who support mental health have become more concerned about who should give certain tests or make statements concerning the implications. This certainly constitutes a significant issue in the training of personnel. The evidence of gross social breakdown in society and schools provoked the start of a new wave of concern, and professionals must be cautious about promising more than they can deliver in screening and rehabilitation in the decade to come.

Careful attention to the relationship between codified indices of personal and social press and follow-up adjustment would be one method of approaching the problem of prediction. Livson and Peskin (1967) found predictor clusters for adult mental health from 30 personality characteristics at ages 5 through 16 years. Quay (1968) and Clarizio

(1968) reported other follow-up efforts while Lewis (1965) found little support for the contention that disturbed children become disturbed adults, and even less support for the efficacy of interventions.

School Intervention Programs

In the past, attention to identification has been so great that little energy has been left for interventions. This paper will not review traditional school case work or referral for therapy. Both time and interest were the inhibitors of adequate liaison between school and referral service in or out of schools.

School mental health programs are becoming innovative, sometimes with a preoccupation on gadgetry. Video taping and Polaroid camera self-substantiation, pictures, "Me" books, ADC mothers as aides, bringing in community personages (Smith, 1967), and contests for school slogans are a few samples of efforts encouraged by government title money and as yet largely unevaluated. Mental health has become characterized by *coping* rather than *contentment*. The achievement anxiety syndrome and its mediation were discussed by Doll and Fleming (1966).

Often behind the successful programs has been the enthusiasm of a dedicated leader; lesser individuals imitate the form without the essence and fail. For many years schools did not use their own media, related as it is to group work and activity therapy. But changes have occurred. Laurence and others (1966) discussed an interesting result of the use of small group methods in schools. Teachers found pupil performance restricted by home and family conditions. They were pessimistic about the possibility of some pupils' achieving school or life goals. In contrast, the pupils were optimistic, though unrealistic, about what they would have to do to meet the goals. Field (1966), in a structured group therapy program to foster self-control in emotionally disturbed boys, found that symptoms decreased and ego function improved. Parents and teachers were trained by psychiatric social workers to become more effective models for accepting, responding, and limit setting. Thoma (1964) reported that in-group work for bright but underachieving girls resulted in improvement in self-esteem, in relationships with authorities and peers, and in grades. Two interesting group examples with adolescents were reported by Carlson and Weinberger (1964) and Belenky (1965). The latter found that a "what's wrong with education" discussion technique increased the identification with school after the catharsis. He noted the importance of preventing regressive behavior in the group counseling from spilling over into the classrooms where it cannot be tolerated. The junior and senior high schools are most in need of help, and these examples provide leads for new types of programs.

One of the more popular processes used in the affective domain with children is role playing. It was used by Simmons (1965) to teach psychology as a functioning subject and to help improve mental health, as well as to enable the teacher to know pupils and identify those in difficulty. The sessions also sharpened the elementary children's psychological awareness. Seglow (1965) compared mixed-sex groups of maladjusted children, using psychodrama with and without individual treatment. He found the psychodrama to be valuable both for diagnosis and in conjunction with individual treatment.

Chesler and Fox (1966) have presented a most useful teachers handbook on role-playing methods in the classroom. While there is attention to theory, practical steps are given with cases, examples, skills, and over one hundred specific ideas. Two broader-gauged teachers handbooks of the same general nature were published by Schmuck, Chesler, and Lippitt (1966) and by Fox, Luszki, and Schmuck (1966). These provided various problem-solving approaches and practices to assess and to work with social climate, social relationships, pupil-teacher interaction, and self-concepts.

Specific techniques in teacher interviewing can be found in life-space interviewing by Redl (1966) and reality therapy by Glasser (1965). As Wagner and Glicker (1966) indicated, these approaches are more suited to school settings than are analytic or nondirective approaches.

Schools continue to use traditional programs and cognitive approaches to mental health. Douglas and Ross (1964) have shown that preschool attendance makes for slightly higher scores on tests of ability and school performance but no better adjustment or less delinquency. Such findings have implications for Head Start programs and mental health. Bessel (1968) presented a program designed to teach self-confidence even at the kindergarten level. Direct work was done on the nature of positive feelings and on things others like and dislike, from the simple to more complex. This is a regularly scheduled curricular experience for normal children through grade 6 and represents a breakthrough in school mental health. Much along the same lines, Quay and others (1966) devised a specific procedure for teaching behavior modeling by demonstration, practice, and eventual transfer to the actual situation. Limbacher (1967) described a book and a course for fifth- and sixth-graders which emphasized the self-image. The child considered his first year of life, needs, adjustment, and defense mechanisms in an activity called pretending; the purpose was to give insights into causes and purposes of behavior. Ojemann and Snider (1964) continued their work which is noted especially for persistent efforts to evaluate changes. Over 400 elementary pupils were observed to discover the possible effects of the teaching program in behavioral science; experimental groups made significant gains. Ojemann (1967) indicated that his program reduced anxiety, arbitrary punitiveness, and antidemocratic tendencies and improved pupil perception of the teacher. Hollister (1967) holds that we will soon be able to develop a double-purpose curriculum for development of specific ego capacities as well as for the usual educational purposes.

Operant procedures have moved from the laboratory to the classroom and have become significant in fostering adjustment in schools. The technique of removal of positive social consequences for deviant behavior was employed by Zimmerman and Zimmerman (1962). Adequate and efficient behavior was shaped in emotionally disturbed boys with the use of social reinforcers. Brown and Shields (1967) found that a program of temporary systematic suspension resulted in a reduction of acting-out behavior in children who were not basically emotionally disturbed. Favorable results with brain-damaged and mentally retarded children were obtained after a longer period of application. O'Leary and Becker (1967) were successful in reducing deviant behavior in an adjustment class employing a token reinforcement program; and Becker and others (1967), in a stimulating demonstration, were able to accomplish the same results by training regular classroom teachers to control the reward system they overtly or covertly used.

Often the proofs of long-term efficacy of behavior modification were as casual as those in the dynamic approaches which were being roundly criticized. Page (1962) called behavior theorists to task for inappropriately applying generalizations drawn from laboratory studies to the classroom setting, and particularly for emphasis on the problem of punishment. Two interesting developments suggest that the period of refinement in operant techniques has begun. Ferster (1967) pointed out the value of natural over arbitrary reinforcements. Solomon and Yaeger (1968) found that teachers have not appreciated the impact of their comments to children. The same "neutral" teacher statement may be seen as praise or blame by various students. A thoughtful analysis of the value of a behavioristic approach in the school setting was set forth by Meacham (1968).

The presence of high-risk pupils—retarded, deprived, disturbed, and underachieving—presents additional problems in mental health planning for the school in general and the classroom teacher in particular. Frequently the programs designed for such pupils are oblivious to their special mental hygiene needs. Further, most of these youngsters are still in the regular classrooms, as the regular teachers know only too well.

It would be impossible to sort out the mental hygiene literature on these high-risk groups since it is voluminous. Even the mental health implications of the segregated special education programs themselves continue to be a largely unattended variable.

The review of the available mental health literature regarding the various high-risk groups has appeared in other issues of this journal and will not be repeated here. Two trends, however, might be noted in passing. Schools are finally seeing the adjustment problems of these pupils as multifaceted. For example, Cohn and Sniffen (1962) concerned themselves with the treatment of underachieving junior high school boys who demonstrated acting-out behavior. Several recommendations resulted from their study: (a) that consideration be given to an ungraded approach, (b) that such pupils be included in group projects outside of their chosen group relationships, and (c) that reading specialists provide individual reading sessions which could lead to discussion of personal feelings and attitudes. Coleman and Hewett (1962) were able to overcome underachieving boys' resistance to psychotherapy through a method described as "open door therapy." Improvements were noted in academic and personality areas. Further, especially with these groups, schools and other agencies must integrate their efforts.

Nash and others (1967) concluded that schools failed to motivate poverty-stricken children and that clinic programs, divorced from a real-life setting, were neither able to hold youth in treatment nor help them mobilize themselves to live more effectively. They suggested that community services should collaborate with schools in comprehensive and integrated planning for multiproblem families. Riese (1962) made a case for a total care program encompassing social support, education, therapy, and prevention, basing conclusions on documented evidence from 20 years experience at a center for the treatment of "untreatable," deprived Negro children. The school was seen by Shaw and others (1967) in a complex socioeducational milieu related to the family and community at large.

Changing the School Milieu

The real place for innovative school mental health programs is in the generic school experience itself—the curriculum, authority pattern, and overall milieu. Otherwise we would continue to produce more maladjustment through the school institution itself. Since there is more delinquency when school is in session than when it is not, as Elliott (1966) suggested, schools have much to do in self-evaluation.

Schools must be organized in such a manner that well-defined roles will emerge for the student. One of the more interesting new concepts is role reversal: for example, making a poor-achieving pupil a part-time tutor. Thus, different requirements are made on the pupil and these different demands bring out new nuances of his nature. Finkel, Sullivan, and Taylor (1968) used this technique in studying delinquents. They obtained quite a different view of life than professionals usually obtain.

Drastic revisions in format and content will be required if schools are to meet their mental health responsibilities. For example, McCreary-Juhasz and Jensen (1968) found that a school camping program made a significant improvement in self-confidence, ability to communicate with peers, development of new interests, cooperative behavior, more realistic levels of aspiration, and higher achievement.

Where the problems are especially acute, as at early adolescence, the trend is to recognize the need to provide a new curriculum based on functional occupational elements rather than to rely on mental health programs as such. Then pupils will not have to be actual or psychological dropouts to escape failure (Lodato and Zweiblson, 1965). Cohen (1963) described a program for antisocial boys built around an industrial art shop. The program produced increases in reading and mathematics scores. Fader and McNeil (1968) have described a language program which has been used in camps, urban schools, and residential settings for delinquents. The detailed research evaluation indicates that a positive personal and academic response may be obtained from these hard-to-reach boys by a totally new approach to language-skill teaching.

The central force of the school mental health movement continues to skirt reality and to ignore the statements of a few persistent, alienated spokesmen. Some schools are already in the midst of social breakdown while others still have time to plan. The central issue for mental health is how to develop an effective, just, and humanistic socializing agency in the school. It must counterbalance the growing aggressive behavior in our society. Gnagey (1965, 1968) is one of the few who have directed attention to this matter, and he points out the lack of worthwhile research. He has evolved a psychological model for classroom discipline.

The school mental health movement of the future must go still deeper into the matter of values, where the prime decisions have to be made. Berkowitz (1964) reviewed the developmental process as indicated by theory and research, and concluded that the tabula rasa theory of child personality was no longer sufficient. Growth-through-gratification theory did not match the need—standards, often frustrating to the child, must be imposed. Koppe (1964) followed a more developmental position, while Edwards (1965), in a literature review, noted that work was being done on intellectual rather than moral development. Raths, Harmin, and Simon (1966) discussed traditional approaches for inculcating values, such as by example, persuasion, limits, inspiration, and dogma. They proposed a process of clarification by the teacher so that the value aspect of a situation can be made visible. Doubtlessly, this is a usable technique, but is it enough? More extreme were the growing child worshippers who saw any adult imposition as tyranny and looked for a spontaneous generation of mental health if adults would but leave the child uncontaminated.

School mental health is in dire need of a research analysis similar to that done by Davis (1965) for mental health in general. He concluded that mental health educators have little or nothing, specific or practical, to suggest except the admonition "Don't be poor or ignorant." He found no supported plan for influencing the emotional development of children. Such evidence would not deter the school mental health agents, and perhaps this is as it should be, given our present state of knowledge and the critical need to do whatever we can. But it might temper our testimony and encourage new creative innovation if the effects of present techniques were more completely assessed.

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CHAPTER III

Measurement in Relation to Mental Health Programs

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This is the first issue of the REVIEW OF EDUCATIONAL RESEARCH devoted to physical and mental health which has included a chapter directed to the assessment of mental health status and the measurement of outcomes of the mental health programs. Since there were a number of significant contributions to the development of measurement procedures in the school mental health field prior to the years with which this article is concerned (roughly 1962-68), a few initial paragraphs will provide a frame of reference for the organization of this review.

The school mental health field prior to the 1960's could be described as an interaction of the school with community mental health personnel and attempts at various applications of treatment and therapeutic procedures developed for the child guidance clinic in the school setting. Views of the role of the school with "disturbed children," with "children with learning and behavior problems," and with the "predelinquent" and other pupils who could not adjust to the demands of the classroom changed from a focus on discovering and treating the causes of behavioral difficulty of children to specific efforts to increase the child's capacity for adapting to the school setting. Attention gradually became centered on the development of assessments of the child's present adjustment status in the school situation rather than a differential diagnosis of the causes of his behavior problems and attempts to modify the causal factors in the hope of obtaining improved school behavior. The concern of specialists in the school mental health field shifted from efforts to treat the causes of the child's difficulty to the expenditure of energy in studying strategies for increasing the child's competency in the school setting.

The outcomes of these prior efforts have been assessment procedures and school mental health programs which seek to tap the school's unique capacity as a primary socializing agent in our society. Observers of the school mental health scene can now perceive the delineation of the school's role in improving the mental health of children, based on the belief that the school has the capacity to promote the positive growth and development of children. Schools now rarely attempt to model their efforts after the clinic in assisting the disturbed or ineffective child to survive in school, but instead have established their own methods of assessment, education, and program evaluation for meeting the challenge of improving the mental health status of children. This is not to say that the methods and processes which are needed to maximize the potential of all the members of the school population have been developed fully, nor that the assistance and support of community mental health agencies are not required. But the present direction seems clear, schools are defining better the data of prior learning, development, and socialization which are necessary to meet the demands of the classroom. School programs are attempting to identify the children who are risking failure in the school and fortifying these more vulnerable children by creating a school and classroom setting which provides missing prerequisite experiences and develops the curriculum according to the characteristics and needs of the learners.

The burden of mental health effort is now more than ever on increasing the plasticity of the school to shape and reshape its programs so as to meet effectively the learning, social, and developmental needs of children. There is an increasing amount of research aimed at determining how best to help children process experience and thereby maximize their potential for growth. These efforts should result in continued differentiation of the distinct but joint responsibility of the school and the mental health community in achieving the critical objective of a decrease in the mental health morbidity rate in the school population.

In order to illustrate the present contributions of measurement in the mental health field and to outline some of the critical issues pertinent to these endeavors, this review will be organized around three main categories of research: (a) assessment of the mental health status of the school population, (b) measures of outcomes of school mental health programs, and (c) issues relevant to the design of operational and experimental studies which employ various measures of change.

The Assessment of Mental Health Status in the School Population

Two excellent reviews (Scott, 1958; Blum, 1962) within the last decade summarized the problems inherent in an attempt to define the parameters of mental health or mental illness for research and program development. Even though Scott centered his discussion on definition and assessment in the general population, his comprehensive review of research definitions of mental health highlighted problems in identifying members of the school population for mental health programs. Scott reviewed the work of many investigators and raised a number of questions about whether or not the term *mental health* referred to a unitary concept or to an artificial grouping of basically different specific disorders. Definitions of mental health which were in common usage at the time of his article fell into six different conceptual groups: (a) maladjustment determined statistically by reference to norms of the society, (b) mental illness defined as exposure to psychiatric treatment, (c) psychiatric diagnosis of mental illness, (d) mental illness defined by objective psychological symptoms in terms of self-ratings or by other test and rating procedures, (e) mental health defined as a report of subjective well-being, and (f) mental health defined as a positive striving. An analysis of the measures, procedures, and behaviors which were classifiable into each of these categories led him to question whether mental illness was an acute or chronic state of existence, whether deviance from social norms was an essential concomitant of mental illness, and whether mental illness should be defined according to values other than social conformity.

Blum (1962) reviewed the variety of methods which are employed to identify a case for treatment. Even though the procedures used to identify cases are, for the most part, methods of obtaining information rather than types of measurement, they are, nevertheless, the procedures commonly employed in the mental health field to identify a population of individuals for epidemiological and treatment purposes. These are psychiatric interviews, guided interviews, symptom reports, reports of physical status, and ratings of social adjustment to family, peers, work, and community. Blum observed that increased attention was being given to social maladaptation as a condition of case definition and cited various arguments for including a criterion of social maladjustment in any definition of a mental health problem. As Blum indicated, there is a very great need for a systematic study of the relationships among the various measures of mental health status and an analysis of the characteristics of cases which are identified by different methods. The terms *mental illness* and *mental health* are not unitary concepts in his opinion, nor were their components delineated clearly at the time of his publication. However, there is need for continued study of the diverse phenomena which determine a position on a mental health–mental illness continuum and their measures. Knowledge of the interrelationships of data collected by these methods and the subsequent development of methods for measuring these interrelationships are central to productive research on the epidemiology of mental health problems in the schools or the community.

The reader will find considerable amplification of the conclusions of Scott and Blum in Dohrenwend and Dohrenwend's (1965) review of the problem of validity in field studies of psychological disorder. This review brings together the equivocal results of several major investigations which have attempted to count untreated and treated cases of psychological disorder. They argued that the absence of evidence for the external validity of these studies was due to the fact that there are no generally accepted criteria, nor is there agreement upon a universe of content which must be sampled in order to determine mental health status. The Dohrenwends discussed the relationship between sociocultural factors and symptoms of mental health problems and cited age, sex, race, and socioeconomic factors as the variables which are most frequently associated with differences in proportions of mental health problems in the population. Another variable which affects the estimates of mental health problems in a population is the extent to which reported symptoms are chronic rather than transitory and the extent to which the symptoms are amenable to treatment. Their conclusion was that a definition of psychological disorder which takes into account these problems would reconcile many of the discrepant results in field studies.

All of the methodological problems inherent in epidemiological studies of the incidence of psychological problems in the general population as well as the absence of an agreed-upon research or operational definition of mental health problems are true of the measurement of school mental health status.

Since being in treatment is a common criterion for locating subjects for the study of mental health problems in the general population, being referred by the classroom teacher is a parallel criterion for locating children in need of special services in the school. Teacher judgment of mental health status of pupils has been validated by studying its relationship to independent and subsequent evaluation by members of a clinical team. A very common procedure for identifying children for special class placement or for gathering information as to the number of children suspected of needing psychiatric assistance has been to query the teacher. For example, Haring and Phillips (1962) studied the progress of children in special classes who had been referred by the teacher and subsequently diagnosed as emotionally disturbed by a clinical team. The clinical team's criteria were hyperactive behavior, below-grade-level school performance, degree of parent cooperation for special class placement, and near average intelligence. Cruickshank (1961), who was interested in locating children with a high probability of having some type of neurological impairment, employed teacher referral as the first step in identifying his subjects. Unless the investigator mentions other methods specifically, it is assumed that the teacher referral initially identified the subjects of mental health programs in school.

Quay, Morse, and Cutler (1966) conducted a factor analysis of ratings of problem behavior traits for 441 children in 60 public school classes for emotionally disturbed children. The results of the analysis provided some information about the kinds of behavior which are typical of children in special classes and give some idea of the types of behavior problems which are typical of children whom teachers refer for special placement and who are later diagnosed as emotionally handicapped. The dimensions were conduct problems or unsocialized aggression, inadequacy-immaturity, and personality problems or neuroticism. Naturally the results of this study depended upon the behavior variables which were being rated, but the resultant factors are reasonably consistent with those dimensions which have been defined in previous analyses of the symptoms of children referred to a child guidance clinic.

In addition to teacher referral, rating forms of a variety of types are frequently employed to locate school children for special study. In two typical studies, the investigators analyzed the characteristics of problem behavior in the general school population. Pimm, Quay, and Werry (1967) analyzed teacher ratings of 100 observable traits which were derived from teacher descriptions of maladjusted classroom behavior. The teacher checked the presence or absence of the behavior and about one-third of the 100 items were judged by teachers to be characteristic of 10 percent or more of their first-grade pupils. A factor analysis of these 36 items yielded four factors: behavioral immaturity, verbal overactivity, conduct problem, and anxiety-withdrawing behavior. They concluded that the behavior of first graders which is most troublesome to teachers represented dimensions related to antisociability, anxiety-withdrawal, and verbal- and motor-impulse control.

Rutter (1967) asked teachers to use a three-point scale to rate children from 7 to 13 years of age on 26 statements of behavior and then found the sum of the ratings on the 26 items. The ratings of children in the general school population were compared with those of children in a psychiatric clinic, and the investigator established a cutoff point on the total rating score continuum which best differentiated between children in the general school population and those in the clinic, those judged to be antisocial, and those judged to be neurotic. In the latter two cases the teachers did not know that the children were clinic cases so that the investigator could make the inference that his rating scale was a valid predictor of behavior problems. Rutter than attempted to validate further the rating scale against independent judgments of children's behavior which psychiatrists made during an interview with the child. Twenty percent of the children in the cutoff region were judged by the psychiatrists as definitely abnormal. Even though this rate was higher than that for the children below the cutoff point, no one-to-one agreement existed between the rating procedure and the psychiatric interview, both of which were independent assessments of the mental health status of these 10- and 11-year-olds.

Another approach to the problem of developing a rating procedure to evaluate mental health status was that of Blatt (1964). He asked sophisticated judges to rank 20 basic, manifest needs in the order most descriptive of "optimal personality integration." The coefficient of concordance was significant from zero at the 0.001 level of significance, and the author concluded that there is considerable agreement about what constitutes mental health. Even though this study was not conducted with pupils in the public school population, it is of interest because it attempts a theoretical definition of the mental health domain prior to developing measures of the relevant dimensions.

Bledsoe (1964) defined mental health at the elementary school level with the results of a factor analysis of the *Mental Health Analysis* and the *California Test of Personality*. Five factors which emerged from the analysis were described by the author as social self (sense of personal worth and feelings of belonging), self-acceptance, social acceptance, mental health "credits," and mental health "debits." Both of the latter factors received loadings from the two subsections of the *Mental Health Analysis*, and the factor loadings for the other three dimensions occurred on the variables of the *California Test of Personality*, indicating that the two tests do not have a great deal of common-factor variance.

Rather than ask teachers to rate problem behaviors of children, Kellam and Schiff (1967) studied the kinds and extent of maladaptation in the public school. They asked teachers to provide lists of the ways children have difficulty in adapting to the classroom. They then sorted the pool of behavior statements into five general categories, each of which represented a general problem of adaptation. These categories were social contact, authority acceptance, maturation, cognitive achievement, and concentration. A final category, global adaptation, indicated the overall adaptation status of the child. Seventy percent of the population received ratings of problems in global adaptation and about 30 to 50 percent of the study population received ratings of maladaptive behavior on the individual adaptation measures. Observations of symptomatic behavior by naïve observers of the children in their classroom provided an independent measure against which to compare adaptation ratings. Children viewed as symptomatic by the observers were rated by the teacher significantly less well adapted than their peers on the social contact, maturation, and global adaptation scales. These results are not inconsistent with the previously cited studies which emphasized an analysis of the behaviors of schoolchildren judged by teachers to have mental health problems.

The fact that the adaptation rates assessed from teacher ratings in the Kellam and Schiff study were unchanged as a result of the intervention is exemplary of the problems inherent in the use of ratings of behavior as measurements of school mental health status and as measures of the effects of program change. Bower and Lambert (1961), in a comparison of the distribution of teacher ratings of children at all grade levels in public school, found differences by grade level in the degree to which teachers use all of the rating categories on a four-point scale. Teachers in the primary grades most frequently used the "never" and "sometimes" categories and less frequently rated children as having problem behavior "frequently" or "all of the time." On the other hand, high school teachers tended to rate more children more negatively. Without confirming data from an independent source, it is impossible to know whether these differences in extent of teacher-perceived problem behavior are a function of the age of the children or of different expectancies of teachers, or whether problems of maladjustment become more clearly differentiated from differences in developmental progress as children grow older.

The work of Glidewell, Domke, and Kantor (1963) presented another approach to identification of children for public school programs prior to the time that the teacher would refer them. They reported the results of 830 mothers' symptom reports for third-grade pupils and compared the number of reported symptoms with teacher ratings of classroom behavior. The adjustment categories that they asked the teacher to rate were these: well adjusted, no significant problems, subclinically disturbed, and clinically disturbed. Each category had a description of the behavior to assist the teacher in the rating process. The symptom reports resulted from private home interviews with the mother of the child. The authors then compared various cutting points of the number of reported symptoms for their predictive efficiency. They determined that using four or more symptoms as a screening criterion selects 16 percent of the population, and, of these, 7 percent are considered to be valid decisions.

Teacher ratings of the sort described here present serious problems to the program evaluator when he attempts to use them as outcome measures in research studies. Before teacher ratings can have maximum usefulness, it is important to control for individual teacher bias in ratings when there is every reason to believe that the initial problem behavior status of children is not different. One approach to solving this problem is to ask teachers to rank each student in the class against each of several single behavior traits and then study the characteristics of children judged by different teachers to be at the extremes. The investigator could then make the adjustments necessary to equate the ratings of different teachers.

The teacher rating that Bower and Lambert (1961) developed as a solution to controlling for teacher differences in rating requires teachers to rate all class members on one behavior at a time for each of eight behaviors. The rated behaviors describe coping and adjustment mechanisms which are critical to the child's capacity to adapt to school. To use the rating, the teacher must first find children who are typical of the extremes of the behavior being rated, and then rank the rest of the children in the class on that trait using a seven-point scale. Ratings of this type actually take no more work for the classroom teacher than rating one child at a time on all traits. The resulting measurement of pupil behavior is considerably more consistent from teacher to teacher of the same grade. Various modifications of this procedure can be made to account for known population differences on particular behavior traits; and the rating model offers a potential for making possible a measurement scale that encompasses the range of problem behaviors at various grade levels, which will afford better control for halo effect and other types of rater bias.

Another solution to reducing the ambiguity in teacher ratings was suggested by Stanley and Wiley (1962). They reviewed the methodological problems in ratings and presented the design of and computation for an analysis of a variance procedure which affords an opportunity to assess the principal and interaction effects in ratings of behavior. The design presented a four-way analysis of variance for raters, subjects, traits, and number of settings in which the ratings are made. Investigators interested in studying identification and measures of change in school mental health programs need to center more on increasing the reliability of teacher ratings, reducing rater bias, and extending the work of present investigations to the development of reliable and valid teacher ratings scales of at least an ordinal level of measurement.

Bloom, Dunn, and Morse (1964) reported the results of parallel data collected by teachers, pupils, and observers on a population of school children in grades 5, 7, and 9. The authors grouped the information collected from each of these sources of information into four categories: learning behavior, child development behaviors, mental health behaviors, and group processes. Indices derived from the ratings grouped into these four categories constituted the measurements which were used for analysis. The correlations between the indices ranged from 0.08 to 0.60. The authors concluded that data regarding pupil behavior from different sources do not represent observations of the same traits and suggested that single sources of information are not sufficient for identification of children with critical mental health problems in the school population.

Dunn, Bloom, and Morse (1964) investigated the extent of common factor variance between these same four theoretical categories of human behavior. The measures apparently represented relatively reliable sources of information (test-retest reliability of 0.70 and commonalities from a factor analysis of scores centering around 0.76), but the correlations between them indicated that measures postulated to reflect status on classroom learning, group process, and mental health were significantly correlated with one another and therefore not independent. There was considable overlap between the hypothesized dimensions. The authors concluded from this that classroom commitment to one theoretical orientation does not preclude commitment to others and that classroom conditions held to be necessary for maximum learning are positively correlated with conditions held to be necessary for mental health.

The work of Bower and Lambert (1961) reported earlier also involved an effort to develop and validate measures of peer ratings and self-ratings of behavior. From a study of children in a very large number of classrooms at all levels of the school population, they developed a common device to capture teacher perceptions of pupil behavior. These were three comparable but separate measures of peer perception and self-perception. Lambert (1963) established a criterion measure of school adjustment status of children in the general school population on the basis of independent clinical evaluations by social workers, psychologists, and psychiatrists. Since the population which was being studied represented a random sample of the school population, the criterion measure incorporated all levels of pupil adjustment represented by children in the second and fifth grade of 11 schools. A later study (Lambert, 1964) investigated the unique contribution of each of the sources of information for the criterion measures. Both multiple predictions and multiple cutoff procedures were used to predict the criterion measure. IQ scores and social status measures reflecting father's occupation, income, family housing, and neighborhood increased predictive efficiency. The multiple R's for second-grade and fifth-grade boys and girls varied from 0.50 to 0.89. When the validity of a multiple cutoff method was analyzed, none of the group with criterion scores above the cutoff was judged by the clinicians to be on the well adjusted side of the mean of the adjustment criterion continuum. Even though the teacher rating had the highest correlation with the independent clinical measures, peer and self-ratings did contribute positively to the assessment of pupil mental health status. Since the IQ score and the social status measures increased the multiple correlation, the author concluded that predicting the mental health of the elementary school population requires multiple measures of the pupils, including not only behavior assessments from teachers and peers but also assessments of intellectual and social status. A discussion of the variables to be considered in developing multiple predictors and multiple criteria for mental health status may be found in Lambert's (1967) article.

Measures of Outcomes of School Mental Health Programs

In concluding the review of the studies of the characteristics and assessment of mental health problems in the school population, it is apparent that even though there is general agreement on what constitutes school mental health, the measures of school mental health employed by different investigators are not equivalent. There are no established criteria for evaluating the effectiveness of school mental health programs. These problems are not unique to school mental health but characteristic of those in the general mental health field. Phillips (1967) challenged the ubiquitous criterion of the extent of services rendered to a target population as sufficient evidence for the efficacy of programs and argued that proper criteria for evaluating mental health programs would be the effectiveness as well as a cost-benefit analysis of the services which are provided. Phillips' position supports the belief of other specialists in the school mental health field that increasing the child's competence in learning and interpersonal behavior is an appropriate objective for school mental health programs and that outcome measurement should test for significant gains in learning and interpersonal behavior. Phillips' arguments about the status of program evaluation were shared and amplified by the contribution of Freeman and Sherwood (1965), who discussed fully the problems inherent in large-scale intervention programs. They implied that, in part, the cause for the failure of evaluators to provide adequate data on the validity of their programs for stated objectives comes from the conflict of attempting to render a needed service and thus becoming both the directors and evaluators of their project. Moreover, they stated, the investigator must supply data to support the fact that there is indeed a target group that can be dealt with by means of the proposed program and that this population is important either because of its size or the intensity of pathology. Additionally, the researcher should provide evidence that the target program is actually undertaken with the specified group.

Freeman and Sherwood asserted that a study of the efficacy of the intervention should approximate the experimental model as much as possible and that, even in the face of difficulty in acquiring appropriate control settings, quasi-designs (Campbell and Stanley, 1963) can approach before-after test conditions through randomization or statistical procedures. They stressed that proper evaluation of outcome requires methods which are direct measures of described change rather than assumed reflectors of change. An example would be the use of an intervention such as a remedial reading program to achieve a program objective of reducing the high school dropout rate. The rationale of such a study would be based on the fact that school dropouts have considerably lower-than-average reading achievement for the school population so that, if one can improve the reading achievement of the population, the dropout rate should fall. The evaluator may proceed to measure gains in reading achievement as the program outcome. If gains in reading achievement are significant, the evaluator can argue that the dropout rate will fall even though he does not wait to gather information at a later time on changes in rate. He might have measured instead the dropout rate as a dependent variable in a remedial reading project. If change in dropout rate occurs, he can argue that the reading program was effective even though there might have been no significant improvement in reading achievement. If dropout rate changes significantly and there are no gains in reading, other unmeasured intervening variables must be found or studied. In either of these cases, the inclusion of measurement of intervening variables provides more information from which to infer the effects of the independent and intervening variables on the dependent measures.

Zimiles (in press) analyzed still other issues in program evaluation and contrasted the most common technique of measurement of outcomes with the need for operational evaluation of school programs. In outcome evaluation, the evaluator enters the program only at the point of its initiation and after the completion of the intervention. Thus he has no knowledge of how to make inferences from the effects of the intervening variables. Only a portion of the actual outcomes may be evaluated, and it is impossible to add to the battery of evaluation instruments those that would be needed upon closer examination of the program. Also, it is extremely difficult in the case of outcome evaluation to examine the interrelationships of methods and treatments and to determine how different combinations of program conditions affected different members of the school population.

Operational evaluation, in contrast to outcome evaluation, according to Zimiles, actively supports program implementation while contributing to methods for the eventual development of more sensitive outcome measures. Operational evaluation specifies the goals of the program, requires a study of the appropriateness of each of the goals for the target population, subdivides the program into component parts, and evaluates the degree to which each part is being implemented according to the original plan. Undertaken as part of the experimental program, operational evaluation makes possible a statement of the variety of compromises which have had to be made and provides evidence for the necessity of such changes in the program from its original conception.

Baker (1967) contrasted experimental design considerations in large scale research projects with those of educational research. Classical experimental design provided paradigms for examining particular problems but designs for large-scale research projects must provide methods fo investigating a complex area of interest. He suggested that the most promising existing bases for these designs are the interdisciplinary approach o operations research which plans for stand-alone experiments, which ar later integrated into the overall project results. Baker's paper provide several other considerations for maximizing the research outcomes o large-scale research.

Two hypotheses generally guide research in clinical treatment of children. Lewis' (1967) review of research in this area examined each hypothesis and the research evidence supporting it. The first hypothesis, tha emotional disturbance in childhood leads to mental illness in adult life is usually examined by means of retrospective studies of adult menta patients and, in one or two cases, by follow-up studies in adult life of a identified group of problem children. The second hypothesis is that clinica intervention in the lives of vulnerable children may interrupt the psychological processes leading to adult mental illness. Statistical analyses o data in these types of research provide equivocal support for both of thes hypotheses. When studies of various interventions used measurement tha assessed specific types of behavior rather than "general adjustment," th results provided more convincing evidence in support of the hypothesi that intervention will produce change in a group's status. Lewis suggeste a more limited direction for research in clinical treatment which ha implications for school mental health programs, such as a study of th effects of assisting children in present social contexts to change their ow disturbing behavior in specific ways. This approach sidesteps the criterio and measurement problem of defining and developing measures of overa adjustment or social adaptation and directs the researcher to state hypotheses regarding the effects of intervening variables on changes in particula behavior and to develop a reliable and valid means for assessing suc behavior change.

School mental health research programs can be classified into thre main categories: (a) programs aimed at providing service to all childre in a school setting, (b) programs directed toward improving the adjus ment status of an identified group of pupils, and (c) programs focuse on improving teacher effectiveness in coping with children's problems i the classroom. The hypotheses governing the selection of groups and treat ments for study in the first group of programs generally state a relationship between the program and an increase in the capacity of the childre to understand their behavior (Ojemann, 1961; Roen, 1967) or to adap better to the school setting (Schiff and Kellam, 1967). In these cases th objective of the programs is to intervene in the school life of childre prior to the onset of problems so that one can affect positively children ability to understand and to cope with their environment. Biber (1961 on the other hand, attempted to relate differences in the curriculum of traditional and modern schools to children's feelings toward self, perception of others, relatedness to people and environment, independence, curiosity, and other measures expected to reflect the psychological impact of different school settings on the child's development. She found, generally, that there were differences in attitudes of children in the schools. Children in modern schools felt more positively toward childhood, while children in traditional schools placed more value on adult roles.

Both Roen and Ojemann used tests which were designed specifically to assess knowledge and attitudes acquired by the elementary school children in their curriculum projects. Roen developed an end-of-course test for his behavioral science curriculum and found that the scores of third-grade children fell between undergraduate and graduate students taking psychology courses. Ojemann was interested in determining whether a curriculum which focused on the causal aspects of human experience changed the way in which children dealt with their own life situations. His findings supported his research hypotheses that teaching children a causal attitude toward behavior results in (a) a reduction in punitive attitudes toward others and (b) more thought given to reasons for action when describing the behavior of peers and adults.

Neither Roen's nor Ojemann's work indicated the degree to which their modifications of the elementary school curriculum affected the status of the school population on general or specific mental health criteria or whether their primary preventive efforts reduced the rates of maladaptation in the schools. In contrast, Schiff and Kellam found that adaptation rates for children in the experimental classrooms were somewhat lower after three years, but not significantly different from rates prior to the time of the program.

In these four programs, designed to have a positive mental health impact on the total school population, the evaluation measures were designed specifically to test the outcomes of the intervention; and with the exception of the work of Schiff and Kellam, the investigators did not evaluate the degree to which the programs had any general or lasting effect on change of attitude or on adjustment status of the children in the classroom. These investigators tested their research hypotheses by determining the significance or differences between pre- and post-program measures or by testing the significance of differences only on the outcome measures for matched or randomly assigned experimental and control groups.

Experimental designs in the second type of school mental health programs involve the selection of a portion of the school population and the introduction of specific types of intervention to modify the school adjustment status of the identified group. These programs hypothesize a relationship between the intervention and its positive effect on specific measures of pupil status that are assumed to be related to school adjustment. These measures may include ratings (either by the teacher or a trained observer), intelligence test scores, number of reported symptoms, achievement test scores, and various psychological tests and sociometric procedures. Even though they frequently employ the same or similar measures for program evaluation, programs assigned to this group of studies differ in the method of locating the experimental and control populations.

School mental health programs conducted by Bower and others (1961); Cowen and others (1966); Glidewell, Domke, and Kantor (1963); and Zax and Cowen (1967) surveyed all members of the school population, each using different methods to determine mental health status and randomly sampled or matched for experimental treatments those pupils who met specified criterion measures. Zax and Cowen employed a pupil personnel team, interviewed teachers, and gathered teacher ratings on all members of the population in order to select groups for their study. Glidewell and his colleagues utilized mothers' reports of the child's symptoms, compared these with teacher ratings, and experimented with three levels of program operation: combined programs of school-centered services and an education program for parents, the education program alone, and a control program involving no mental health services. The California study led by Bower assessed the adjustment status of over 20,000 pupils by employing teacher, peer, and self-ratings of behavior and combined scores from these ratings into a multiple cutoff criterion to select several experimental samples in each of 30 school districts in the state. Bower and his co-workers established, by random assignment, experimental and control groups for several different types of interventions which included consultation to help teachers with classroom problems, assistance to children to improve achievement and classroom behavior in learning disability groups and special classes, activity groups at the elementary grade level, group counseling for secondary school pupils, and a parent-counseling program. Those programs which centered on helping the child to master school learning and to become more competent members of the school population showed the greatest change in outcomes. This group of investigators measured program outcome with teacher, peer, and self-ratings and achievement and ability tests.

Other programs which provided assistance to a specified group of pupils employed teacher referral as the method for identifying the project population. Haring and Phillips (1962) subjected to clinical evaluation those children referred by teachers as emotionally disturbed. They studied the effects of structured and unstructured classroom programs on ratings of school behavior and measures of school achievement. Cruickshank and others (1961) utilized referrals from teachers and clinics to locate their study population. They selected those whose behavior and learning problems were most suggestive of brain impairment and then conducted extensive psychological, pediatric, and neurological studies of the subjects. After matching experimental and control subjects on hyperactivity, sex, and mental age, they studied the effects of a distraction-free classroom environment as compared to the ordinary classroom setting. Even though Cruickshank and his colleagues hypothesized a relationship between classroom environment and extent of hyperactivity, they did not measure change in hyperactivity as a dependent variable.

Hewett (1967) studied the effects of systematic reinforcement of behavior in special classes. He also identified his subjects from teacher referrals of children with learning and behavior problems and then randomly assigned children to experimental and control groups. In addition to Hewett's work, several other programs recently have centered on a study of the modification and maintenance of behavior of school children through the systematic application of reinforcements (for example, Bergan and Caldwell, 1967; Quay and others, 1966; and Staats and others, 1964). These studies of behavior modification also employ teacher referrals, teacher rating, and sometimes self-selection to identify experimental subjects. Behavior-modification studies are presently the only efforts that can be classified as school mental health programs that use rates and extent of response (or number of reinforcements) over time as evaluation measures. To this extent these programs approach Zimiles' (in press) suggestions of operational evaluation, and they would also satisfy the recommendations by Lewis (1967) and by Freeman and Sherwood (1965) to employ measures of specific rather than general behavior outcomes.

Even though they are focused primarily on rendering assistance to teachers in classroom management, workshops and consultation programs aimed at increasing teacher effectiveness create special problems in attempts to evaluate experimental outcomes. In some cases (for example, Clos, 1966), programs attempted to change teacher attitude as measured by the *Minnesota Teacher Attitude Inventory*. In other cases, the researcher may wish to search for an index of general school mental health status, such as rates of vandalism and absences (Duhl, 1964) or change in types of teacher referral as measures of the effects of intervention programs designed to change teacher behavior. The researcher may wish to use instead some of the scales and checklists described by Iscoe and others (1967) to assess the outcomes of a school consultation program. It is not clear to what extent programs and their evaluation will differ as a result of a decision to evaluate the effectiveness of a particular program in changing teacher behavior or in changing the mental health status of pupils.

The repeated use of certain outcome measures reflects their acceptance as indicators of the mental health status of members of the school population. These measures assess school achievement, intelligence, classroom behavior, type and number of symptoms, attitudes of pupils toward themselves, and children's understanding of the dynamic and causal nature of human behavior. Even though there is a good deal of consistency in the measures employed to evaluate outcomes of research on school mental health problems, there is no consistency in their use; and many of them are, at best, only indirect evidence of the effectiveness of programs designed to modify specific behaviors. There is need to search for methods which can amplify the operational aspects of programs or provide an ongoing evaluation of the interaction of specific types of children's problems with the varied aspects of the methods under study. Computerized systems for processing information in psychiatric clinics (Eiduşon, Brooks, and Motto, 1966; Starkweather and Decker, 1964) provide methods by which future researchers may find it possible to analyze behavioral events collected during research to determine the correlation between types of subject behaviors and subject response to the intervening variables. These methods offer the investigator the possibility of gathering operational data for research analysis and enhancing the research process by collecting a more comprehensive set of behavioral data for later study.

Measurement of outcome in school mental health research must resolve an additional problem, that of matching program intervention more appropriately to subject needs. In all of the research reported previously, subjects were identified and then assigned to experimental treatments as if they represented single rather than multiple types of problems. It is clear from the research on identification of school populations for mental health programs that a variety of pupil problems are represented in the sample of pupils referred by teachers. Tailoring the intervention for the pupil problem in question and studying its effects should occupy the activities of investigators in the immediate future. Battle and others (1966) suggested the study of change in subject's perception of target complaints as criteria for improvement in psychotherapy, but Cronbach (1967) pushed this idea further in his paper on adapting instruction to individual differences. Cronbach suggested that the outcome criterion be specified and that the investigator choose a treatment in line with what he knows or can determine about the effectiveness of different treatments for differences in subjects. If the school mental health field continues to concern itself with the individual child's capacity to adapt to the school environment, then investigators will need to collect considerably more information on the validity of specific types of methods—for example, inductive approaches for withdrawn, shy children and deductive approaches for acting-out, impulsive children—for the achievement of criterion behavior.

Issues Associated with the Measurement of Change

The problem of change measurement in program evaluation is a difficulty common to all areas of the social sciences. Obvious evidence of concern over these difficulties was the appearance of the volume *Problems in Measuring Change* edited by Chester Harris (1963). Although the researcher interested in program evaluation might profit from a familiarity with all the papers presented in this volume, only those most pertinent to school mental health research activities will be mentioned here. Most evaluation of treatments in mental health programs has consisted of obtaining pretreatment and posttreatment measures (typically, test scores, ratings, or nominal counts). The chapter by Lord (1963) was especially valuable in highlighting issues in this type of change measurement. He noted that the usual procedure of comparing mean observed change for treatments is likely, as a consequence of initial differences in treatment populations, to misrepresent the "true" magnitude of the treatment effect. Observing that experimental control for the effects of pretreatment differences is often impossible, Lord strongly recommended the use of analysis of covariance for making appropriate statistical adjustments for initial differences on important pretreatment measures.

Campbell's paper (1963) suggested promising ways to evaluate change in programs that systematically sample behaviors over time. The three quasi-experimental designs proposed by Campbell are for use with time series data. They seem well suited to the situation commonly encountered in program implementation where the investigator has the opportunity to observe sequences of behavior over reasonably long periods of time, yet there is failure to meet some of the requirements for use of a "true" experimental design. Although not all of the statistical problems associated with these designs have been solved, their use should be given careful consideration by researchers interested in program evaluation. These designs seem helpful in that they allow a more careful specification of treatment effects during the intermediate phases of the program, a very desirable procedure according to Zimiles (in press) and Freeman and Sherwood (1965), who have argued for more attention to explanations of the influence process of programs rather than attempts to measure global outcomes.

Bereiter (1963) provided a general overview of the most urgent problems in change measurement. Of these three critical issues, the last, termed the *physicalism-objectivism dilemma*, has the most far-reaching implications for program evaluation. Bereiter identified this dilemma as the choice "between objective measures of change within the province of differential psychology and meaningful measures that carry the stigma of subjectivity" (1963, p. 20). According to Bereiter, the latter of the two choices may be the only alternative which allows the evaluator to make interpretable comparisons between changes in variables for individuals who differ systematically prior to treatment.

Also of possible relevance to change measurement in mental health program evaluation are other papers appearing since 1962. Tucker (1967) proposed an interesting variant of cluster analysis, one which investigates individual differences in within-individual relations between variables. The procedure can be used to categorize individuals such that the within-individual relations are similar for all individuals in a category and differ from category to category. At some subsequent time, a shift in the variable relationships would constitute evidence of change—a change in structure rather than level on a scale. Since information on several variables is routinely gathered in most mental health programs, Tucker's procedure provides an alternative route for assessing anticipated change.

Schaie (1965) suggested a model for studying change which separates the effects of age, time of birth (generation), and time of measurement.

Such a model would be most appropriate when the program was expected to be of rather long duration. In such circumstances it could be expected to provide a way to determine the importance of environmental and cultural factors as well as treatment in producing change.

The work summarized here suggests that mental health assessment of school children will continue to reflect measures of the child's adjustment to the demands of the classroom and that the teachers and other observers (including the child himself) need to be involved in a multiple-dimension assessment of the child's adaptational progress in the school setting. While certain general criteria for adaptation to the school (for example, achievement, behavior ratings, ability test scores) are available as outcome measures for mental health programs, investigators in the next decade should begin to focus not only on differential assessment of problem behavior, but also on matching these assessments to appropriately selected differential treatments to maximize the potential for mental health interventions. Only in this way can education achieve its general objective of providing for the full development of the child's potential and adapting education to the individual child.

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CHAPTER IV

Utilization of Mental Health Professionals in the School

WILLIAM C. RHODES

The Two Realms of Mental Health: Psychic and Developmental

In addressing the topic of the utilization of mental health professionals in the school, it is necessary to call attention immediately to the recent bifurcation in mental health. We are witnessing the emergence of two distinct realms of mental health, but with some overlap and some exchange of conceptions, modes of intervention, and professional personnel. One is the older and more familiar psychic realm. Although this realm is undergoing unheaval and change, it is still recognizable as a derivation of the older, clinical, psychic model.

The other realm may not be recognizable as mental health except by the guilds represented in its practitioners and by its basic psychosocial origins, the same origins from which the older branch of mental health has grown. This newer branch of mental health has a more substantive relationship to education. It is the developmental realm of mental health—a realm with a clearer relationship to, and substantive input from, educational philosophy, theory, and knowledge. Although new, it has surged ahead in the theory and practice of many mental health professionals, who are moving away from the pure psychic approach to one of human "effectance" or the efficient feelings and behaviors of the individual.

This developing bifurcation of mental health into the psychic and developmental realms is most clear-cut in the child mental health area. The professionals who devote themselves to child mental health are breaking new ground at a rapid pace and have been more tolerant of deviation and radical innovation. Therefore the splitting off of the two major branches into distinctive orientations, methods, and operational patterns has progressed further in this area than in any other. Both branches have moved decisively toward mergers with education and the location of their site of operation in the schools. Both perceive a need for the participation of mental health professionals in the community rearing process for children.

This new dual emphasis of the mental health professional concerned with the school has been brought out very clearly in the current deliberations of the Joint Commission on Mental Health of Children, which is charged by legislation (P.L. 89-97, 1965, as amended in 1967) to prepare a report for Congress; for the Secretary of Health, Education, and Welfare; and for the 50 governors on the status of the nation's children with respect to mental health and mental illness and the remedial and preventive steps which may be taken. In the various deliberations of the task force groups appointed by this commission to carry out its charge, one can see strong representation from both realms of mental health as they examine the schools and the educational process.

Nowhere is the bifurcation of the two distinct realms of mental health more clearly summarized and exemplified than in the two different school operational patterns prescribed as sweeping solutions to human problems in the community. One illustrative pattern is that of the Frank Porter Graham Child Development Center, which is being developed at the University of North Carolina at Chapel Hill under the direction of Halbert B. Robinson (1968). The other pattern, which is not yet being implemented, may be represented by the Clinical School designed by Estor Rothman and Pearl H. Berkowitz (1967).

The Frank Porter Graham Child Development Center has all of the elements of the new developmental emphasis in mental health. It is aimed primarily at the culturally deprived child and aims at intervention rather than treatment. It also includes ambitious longitudinal research dealing both with normal childhood development and with the effects of various programs of intervention. The purpose of the center will be concentrated in two broad areas: (a) to help break the cycles of retardation, poverty, and disease by providing an opportunity for optimum development during the crucial formative years and (b) to develop an understanding of the antecedents of a wide variety of behavior patterns pertinent to educational achievement and mental and physcal health.

The center will consist of a day-care facility for 240 infants and children of working mothers and a school for 550 primary and elementary schoolchildren, chosen to be representative of all segments of the diverse community. The programs will seek to overcome what is seen by the center founders as a "drab, routinized, unstimulating succession of predictable, largely empty, hours and days" for the culturally deprived child and will seek to develop achievement motivation, provide important relationships with adults, work extensively with families of the children, and provide comprehensive medical and dental care. This ambitious program incorporates all of the distinguishing characteristics of the newer realm of mental health:

1. Positive development rather than cure is the avowed goal.
2. The concept of prevention is subsumed in the concept of development.
3. The very early years are highlighted as the appropriate entry point for major influences.
4. A longitudinal and sustained pattern of influence forces is offered.
5. Education, rather than treatment, becomes the major influencing force.
6. The child's being rather than his psyche is the central theme, therefore it draws upon the broad body of human science knowledge rather than only that part devoted to personality.

7. The child is more clearly the subject of the endeavor rather than the object. He is a participant-learner and teacher of the professional rather than a patient of the professional.
8. The institutional facility involved in the intervention forces is a development center or school rather than a clinic or hospital.

The clinical school possesses all of the characteristics of the psychic realm of mental health. It focuses upon a specific category of children called "disturbed or mentally ill." Rothman and Berkowitz (1967) reasoned that since more than half of the total available hospital beds are devoted to mental illness, something more must be done and better methods must be found, particularly for emotionally disturbed children who need help the most. The better way they suggest is the clinic school.

The basic influencing force to be brought to bear upon this state or condition of illness in children is treatment. "Therapy" would be the keystone of a variety of programs and would be seen as a total treatment program staffed by psychiatrists, psychologists, social workers, and counselors working with every other specialist in the school. It bears most of the earmarks of a clinical operation. Like the Frank Porter Graham Center, however, it would enter into a partnership with education and merge the clinic with the school. It also departs from the conventional clinical conceptions in that it recognizes the necessity for other social forces and structures to provide ancillary resources to support the treatment effort. Rothman and Berkowitz suggested that welfare programs, medical and dental programs, citizens programs, and research and training programs should be incorporated into the clinical school structure.

From this review of the two distinctive operational patterns and structures, one can obtain an overview of some of the sweeping developments and changes taking place in the application and utilization of mental health concepts and professionals in the school.

Utilization of Developmental Mental Health

Early Intervention

The most radical change which seems to be emerging from the cooperation of mental health and educational professionals in the school is in the area of the very young child. Here again we perceive the influence of the developmental realm. Among those professionals who are involved with the school systems in their area and who are pioneering psychosocial and psychoeducational interventions in the early growth processes of children from birth through the primary grades are Deutsch (1963) in New York City, Schaefer (1965) at the National Institute of Mental Health, Gray and Klaus (1965) at George Peabody College for Teachers, Robinson (1968) at the University of North Carolina, Gordon (1967) at the University of Florida, and Radin and Weikart (1967) in the Ypsilanti School

System. Out of their work are coming profound implications regarding the formation and stimulation of the child's mental and developmental potentials.

The impact which interest in the area of early childhood education is having in this nation is exemplified by a program funded under Title IV of the Elementary and Secondary Education Act. The U.S. Office of Education funded in 1967 a network of six cooperative and coordinated research and development centers representing various approaches to early childhood education and different focuses on basic research, curriculum development, teacher training, and the like. The National Coordination Center is at the University of Illinois, with participating centers at the University of Chicago, the University of Arizona, Cornell University, Syracuse University, New York University, and George Peabody College for Teachers.

Preschool Years

It is in this area of early childhood that the mental health and educational professionals are rediscovering the extraordinary plasticity and the endless possibilities of man for becoming. Here they are rediscovering the richness and variety of man's capacities and redefining the limits which we have imposed upon him by our premature theories and beliefs on the one hand and by the kinds of environments we offer him for his development on the other.

Hunt (1966) summarized some of the barriers which our own premature conclusions had imposed upon the child's development: (a) a belief in fixed intelligence; (b) a belief in predetermined development; (c) a belief in the fixed and static telephone-switchboard nature of brain functioning; (d) a belief that experience during the early years, particularly before the development of speech, is unimportant; (e) a belief that the experience that affects later development is a matter of emotional reactions based on the fate of instinctual needs; (f) a belief that learning must be motivated by homeostatic need, by painful stimulation, or by acquired drives based on these. He pointed out some of the new knowledge and research which contradicts all of these formerly held convictions. It is this kind of rediscovery and sweeping away of old theoretical blinders that has stimulated the vast outpouring of experimentation in the ever earlier education of the child.

We have also rediscovered the potential impact, good and bad, of the environment and of the planned context of a child's life. The very important longitudinal follow-up by Skeels (1966) of his early experimental and comparison groups has come at a time in which the concept of a fixed intelligence is being challenged by multiple-intervention studies. In a study of children, which he followed up over a generation span, Skeels studied one group of children adopted into a relatively enriched family environment and another group of children who remained in relatively sterile environmental contexts. Today, many years later, there is a profound difference in the lives of the subjects involved in the two groups. The adopted group is part of the mainstream of contributing society and has produced offspring with normal and above-normal intelligence. The other group is stunted, completely out of the mainstream of society, and is filling the statistical categories of demeaned and unrealized lives.

The impact of the environment and the timing of its input in the child's development has taken on new significance with the important studies and conclusions of Bloom (1964) and his associates. Bloom maintains that the introduction of the environment as a variable makes a major difference in our ability to predict the mature status of a human characteristic. He finds that variations in the environment (education's major medium for teaching) have the greatest quantitative effect on a human characteristic during the least rapid period of change.

From a more specific point of view, the recent rediscovery of the relationship between psychosocial characteristics in children and conditions of external environmental deprivation is having a decided impact upon what mental health professionals are doing in connection with the schools. The whole concept of deprivation and its effect on mental development and cognitive styles is causing the educators and mental health specialists to focus upon deprivation associated with lower status position in children and upon deprivation in relationship to the crucial significance of the parent. The work of Bereiter and Engelmann (1966), Hess and Shipman (1966), Hunt (1966), and Riessman (1962) has addressed itself to this condition of deprivation associated with lower class status. Ainsworth (1966) presented one of the best current reviews of material on maternal deprivation.

Early School Years

The surging vitality of research and utilization effort is concentrated in the early preschool years, but it is not limited to those years. An interesting situation develops, however, as we move away from the preschool years. Once we move out of this age group we are likely to find the mental health professional person presenting endeavors which include both the developmental branch and the psychic branch of mental health when he approaches the school.

As an example of the more clearly developmental realm, the National Institute of Mental Health supports five pilot university training programs concerned with a new type of mental health professional worker. These are the child development specialists, who will concentrate fairly heavily upon the elementary school and will be concerned, in general, with the mental health of all children. Training programs are being funded at the University of Michigan, George Peabody College for Teachers, Kent State University, University of Chicago, and Florida State University.

Within the area of direct service programs the U.S. Office of Economic Opportunity and the U.S. Office of Education are funding special pilot projects which take up where Project Head Start left off. This is the Follow Through Program, which picks up many of the children who have participated in the Head Start program. The pilot projects include about 3,000 children in 30 selected communities around the country.

An interesting preventive approach to developmental problems in elementary schoolchildren has been taking place in Sumter County since 1960. This project has been conducted by the South Carolina Department of Mental Health and was recently reported on by Newton and Brown (1967). It involves three experimental and three control schools and includes a preschool check-up, plus group and individual interventions. The interventions are to be evaluated in terms of their effectiveness by continual study of the child during the early school years. The project is designed so that children entering 18 first-grade classrooms in the six project schools would be followed for four years. The preschool check-up evaluated children in the spring and prior to school entry in the fall to predict their ability to cope successfully with school entry and future school stress in the early school years.

The Psychic Realm in Mental Health

The Emotionally Disturbed Child

As far as children are concerned, the psychic realm of mental health establishes its base squarely upon concern with the emotionally disturbed child. The mental health professional was originally so fascinated by and preoccupied with divergent behavior as psychically derived that he devoted all his energy to children whom he could identify in this way. Having explored and discovered the inner dynamics of children who were most patently different, he began to generalize these discoveries and conceptions to include more and more children. Having singled out many children who were so afflicted, he began to try to estimate the proportion of children with the affliction.

One of his major problems was the definition of such children. It became particularly difficult when he moved his locus out of the clinic and into the school. Because of the differences in the two settings and the imposition of characteristics of the systems upon the labeling process, he had to try to come up with meaningful amalgams. In spite of years of effort and heroic attempts at satisfying the definitional problem, there is still no agreement. Therefore the term *behavioral disorders* (or *behavioral problems*) has come into practice as the more useful term when applied to such children in the school system. Behavioral disorders can be aggression, rebellion, nonconformity, acting "strangely," and so on. The list depends on the one listing and the conceptual point of view which he assumes. We can get some general agreement, however, between teacher and clinician on certain children who exhibit large numbers of such behaviors; exhibit them frequently and intensely; and, therefore, can be labeled as disturbed (Goldfarb, 1963).

Glidewell (1967) estimated that some 30 percent of elementary school children presented some problems of maladjustment and that 9 percent of these presented problems which were judged severe enough to justify clinical attention.

The Biometry Branch of the National Institute of Mental Health (NIMH, 1968) reported that the number of children under 18 years of age receiving care in outpatient psychiatric clinics in 1966 was double the number seen in 1959. Increase in the child population accounts for only a small part of this increase. The Biometry Branch also reported that both first-admission and resident patient rates in state and county mental hospitals among those under 15 years of age have doubled during the last decade.

From these various estimates it can be seen that no matter how you define emotional disturbance, the schools are faced with a sizable problem. However, the way in which we do define the problem has a significant effect on the type of school program which the mental health-oriented professional will help to construct.

According to Rhodes (1966), at least three divergent points of view concerning such children are being operationalized in school programs:

1. The psychodynamic point of view has held sway for a long time both in the clinic and in the school-oriented work of the mental health professional.

2. The behavioral point of view surfaced in the early days of psychology's interest in changing troublesome behavior (for example, Jones, 1924; Watson and Watson, 1921) but then drew back for many years into the psychological laboratory and classroom. Only recently has it re-emerged in school and other institutional structures. This new emergence has provided a challenge to psychodynamic thinking and has enlisted school programs in the ensuing controversy.

3. The ecological point of view (Rhodes, 1967) is less definitive and much less developed than the other two constructions of human problems. Subsumed under this umbrella are those mental health and behavioral professionals who are reinterpreting motivational theory and research to accentuate the positive and human-mastery drives in man (White, 1959) and who attempt to reinterpret much of our mental health action knowledge into social competence concepts (Rae-Grant, Gladwin, and Bower 1966; Smith, 1965).

The ecological point of view acknowledges the need of the community to label bothersome children as disturbed, but at the same time recognizes disturbances as a symbiotic condition existing between the individual child and his environmental context. Disturbances are seen as a situational state, in which the disturbance lies not so much in the child as in the transactional arc between the child and the constantly present external context. It is their upset by him, as well as his own human state, which creates disturbance. In a way he is only one of the contributors to a disturbance.

If the child is seen as the disturbance, this means that those who come in contact with him are disturbed by him. In this point of view, disturbance lies in the ongoing action-exchange process which takes place between the child and the resonating others around him. It lies as much in the feeling states and behaviors which are triggered by his differences as it does in his differences. It lies as much in the complementary response and interpretation of the observers as it does in the child's differences.

Project Re-Ed (Hobbs, 1967), which completed its demonstration phase in 1968, was established upon the basis of this particular view of emotional disturbance. The condition of emotional disturbance was perceived as a transactional state which interfered with the normal growth-and-development interchange which ordinarily exists between the child and his contiguous environments of home, school, and community. Seemingly, the most efficient intervention was the interruption of the agitated exchange which was interfering with the ordinary growth and development which occurs in the symbiotic exchange between child and environment. Re-education was seen as the vehicle for intervention. When the deviation in exchange between child and environments was not too gross, the intervention could be relatively simple. The child who was disturbing to others or who was considered disturbed by others could be temporarily removed from his contiguous environments or ecological units, and two efforts could be made. One would be to deal with those characteristics of the child which were upsetting in his ordinary contexts of home, school, and community; the other would be an attempt to reduce the agitation in the responsive contexts or ecological units, to call out their constructive responses, and to make slight modifications or ameliorations which would reduce the disruptive quality of the interchanges between that ecological unit and the child. The attempt was to interrupt the perpetuation of the agitation by both parties.

Ideally, the school should be educated to its own involvement in and its own contribution to disturbance: its own peculiar answering responses to child states which trigger intense actions. For an example of the ecological or transactional quality of child states which worry or bother us, we can look at a very significant set of studies by Rosenthal and Jacobson (1968). In some of his early experiments, Rosenthal presented an experimenter with a group of laboratory animals, telling the experimenter what kind of behavior he could expect of the animals. In one experiment the rats believed by their experimenter to be the brighter performed significantly better than those believed to be dull. Since all rats were from the same strain, something in the orientation of the psychology student-experimenter influenced the animals' performances. The same experimental paradigm was then transposed to the classroom (Rosenthal and Jacobson, 1968). Teachers in grades K through 5 were told that they were helping to validate a test for academic blooming. About 20 percent of the children taking this pseudoblooming test were designated arbitrarily as potential academic spurters. The results of the experiment indicated strongly that children from whom teachers were led to expect gains showed such gains. The teachers, because of their induced expectations, entered into a situation which influenced the child's performance. Later, the teachers were asked to describe the classroom behavior of their pupils. The children from whom intellectual growth was expected were described as having a better chance of being successful later in life and as being happier, more curious, and more interesting than the other children. This is a rather vivid demonstration of the subtle ways in which the supposedly detached observer is deeply implicated in the observed phenomena. It opens the way for questioning the degree to which one can attribute a psychosocial condition which seems to be attached to and possessed by an individual solely to the condition or state of that individual. The way is open to suggest that human problem conditions which we refer to particular individuals are really a product of the exchange between the individual and those within his life-space.

In the *behavioral* proponents, we have a different analysis of the children whom the teacher and mental health professional call emotionally disturbed. There is actually a wide range of different behavior modification theories and measures which are applied under this rubric (Rhodes, 1962). Generally, they are related to some form of psychological learning theory. According to Ullmann and Krasner (1965), behavior modification is the "application of the results of learning theory and experimental psychology to the problem of altering maladaptive behavior" and "in terms of both the development and change of behavior, no distinction is made between adaptive and maladaptive responses" (p. 2). The practice of this approach in the case of emotional disturbance has come into existence as a self-conscious alternative to intrapsychic or psychodynamic conceptions and therapies.

Eysenck (1959) has strongly attacked the intrapsychic proponents and has declared that learning theory approaches the disturbed behavior quite directly and simply. This theory does not regard neurosis as having underlying symptoms, i.e., the neurotic symptoms are simple, learned habits; and if the symptom is eliminated, then the neurosis is eliminated. The behavioral exponent sees the problem as lying in the child—specifically, the child's behavior. The problem then becomes one of changing the behavioral repertoire of the child. Each type of learning comes about by pairing behavior with environmental reinforcement. Since the teacher is in control of the environmental reinforcement, it is this aspect of the situation which he manipulates. Among the alternative actions provided for him by learning theory, he can choose many different methods of the use of environment in connection with behavior in the learning situation, such as positively reinforcing desirable behaviors, negatively reinforcing undesirable behaviors, ignoring behaviors formerly reinforced, or having the child repeat the undesirable behavior until he is tired of it. These are only a few of the learning theory applications which can be included under the heading of behavior modification. Among the many reports of applications of this point of view and methodology in the school are those of Birnbrauer and others (1965), Hewett (1967), Patterson (1965), Raab and Hewett (1967), and Wolf and others (1967).

One of the major weaknesses of the behavior modification approach, aside from its humane and ethical aspects, is its limitation to a one-to-one human change model. One of the few researchers who has applied it to the group form of the classroom is Hewett (1967).

The *psychodynamic* conception and methodology is largely oriented toward intrapsychic disturbances. It requires a framework for unusual differences in children which calls for early identification, prevention, diagnosis, and therapy. It is within this framework that emotional disturbance and mental illness have their most carefully elaborated meanings. The observable differences in children's behavior that cannot be accounted for on the basis of internal physical factors or low intelligence are generally assumed to be an intrapsychic problem.

Formerly this approach was largely within the jurisdiction of clinical mental health. Its special functional components of diagnosis and therapy were performed primarily by those who were clinically trained in mental health or psychiatric settings. Recently, however, there has been a decided shift in the exclusiveness of the psychodynamic orientation. Clinicians have joined forces with educators, and there has been a merger of theory, practices, programs, and even structures. It could be claimed that psychoeducational method is totally new, an amalgam of the clinic and school. Principles and practices of psychodynamic and educational theories have been fused into something different from either of its progenitors.

A good example of this fusion, reported by Donahue and Nichtern (1968), is the psychoeducational pattern used in the Elmont (New York) project and transferred to other school systems and other parts of the country. They summarized it as "a fusion of the elements of acceptance of responsibility by the community; the team approach of educator, psychologist, psychiatrist, and social worker; and motherliness and abiding love" (p. 17). The project, as conceived and translated in other places, provided only for the most seriously disturbed children. It called for unusual skills in community organization and in supervision of nonprofessional "teaching-moms."

The aim of the Elmont project was to keep seriously disturbed children in their own homes and under the influence of an educational regime which was an extension of the school system. The goal of the psychoeducational program was to individualize training through optimum relationships and to reintroduce the child into the regular classroom. Six children between 6 and 8 years of age were in the original project, with twelve teaching-moms responsible for their school day on a one-to-one basis. The teaching-moms were supervised by an elementary school teacher and were supported by mental health professionals. At the end of five years of the program's operation, a total of 31 children had been involved in the project. Of these, 21 had been successfully returned to regular classrooms, one had been hospitalized, and one had moved.

This project fits the psychodynamic model very well. It emphasizes diagnosis as the method of identifying very sick children, specifies the importance of a one-to-one relationship paradigm, and deliberately conceives of the training and educational regime as therapy.

The Use of Consultation by Mental Health Professionals

One of the problems which has faced the psychically oriented mental health professional who has attempted to work within the school structure has been the inefficiency of his major tools. His key techniques of diagnosis and therapy were laborious and cumbersome even in his own setting of clinic and hospital. When he moved into the school with these two methods, he found them inappropriate for the group-centered patterns of operation in the classroom. As a result he has refashioned an older method of professional-to-professional communication—namely, consultation.

Like teaching or psychotherapy, consultation is a major medium for human problem solving and human change. It provides the vehicle through which two people or groups, from two specialized vantage points, bring their contributions together to influence a particular problem situation, and at the same time influence each other in their work roles. Consultation actually refers to a broad range of activities conducted under that rubric. As a method and theory used by mental health professionals within the school context it can be either highly focused and specifically oriented to the psychic realm of children, teachers, and administrators, or it can be broadly focused and include characteristics of individuals, organizations, and environments.

Some of the strengths and difficulties contained in this medium of exchange between mental health and educational professionals can be found in Part II of a book by Sarason and others (1966) on psychology in community settings and by Newman (1967). Chapter 7 of Newman's book provides poignant documentation of some of the frustrating limitations imposed upon any method or any professional by the structural arrangements of an agency or establishment. The method of consultation, like any method, takes place in an organizational context. The intent of the two helping people—teacher and mental health consultant—is heavily influenced by the dominating organizational components of power arrangements, institutional maintenance, structural arrangements, and operational traditions.

For the mental health professional, consultation has a generic relationship to counseling and psychotherapy. The psychotherapeutic orientation is most clearly evident in the consultation theory espoused by Gerald Caplan (1959, 1964). His view of consultation is only slightly removed from traditional psychotherapy. It focuses much more upon psychodynamics than upon the content which the mental health professional brings to the relationship. From his perspective of intrapsychic dynamics, he focuses upon crisis-consultation, and sees the time of crisis as an optimum moment for human change and human resolution of intrapsychic obstructions to problem solution. In contrast to the school consultation described by Sarason and Newman, this type of consultation is much more circumscribed, and at the same time is much more highly focused. Sarason and Newman both seem to be more concerned with psychoeducational and psychosocial problems. In fact, Newman, in describing the staff of her project, referred to them as psychoeducational consultants. Perhaps here, in microcosm, we can discern some of the differences in quality, orientation, and dimension between the mental health professionals whose roots are strongly embedded in psychic conceptions and those who have a broader orientation to diverse dimensions of human functioning in society.

For further understanding of the range and varieties of consultation see Klein (1967) and Wolff (1955). For a description of some of the problems, processes, and accomplishments possible in a collaboration between the health agency and the educational agency concerning the medium of mental health consultation, the reader should study the reports of Glidewell and Stringer (1967), Sarason and others (1966), and Schiff and Kellam (1967).

Issues and Conclusions

We are in the midst of a profound revolution in the relationship between the individual and society. This revolution expresses itself in vigorous attacks upon or critiques of basic social contexts which have the greatest life-impact upon the growth and management of human beings. Landmark critiques of the school such as the Conant report (1961) and critiques of the family such as the Negro Family (U.S. Department of Labor, 1965) have showed us the huge fissures in our social framework.

The school as a major social context which both contains and interacts with the individual over increasingly extended periods of his life, is undergoing severe scrutiny and change. Although there are other major institutional sites in which the revolution is also happening (for example, the Social-Welfare System and the Religious System), the family is the only other social context which assumes such sweeping developmental responsibility of such a critical nature and over such a prolonged period of the individual's life.

Like the family, the educational institution serves a dual function for the community. It maximizes the claims and needs for individual realization on one hand, and it becomes the source of socialization and social control on the other. The educator and the mental health professional, working within the school system, are caught in this dynamic duality. They are faced with a showdown with respect to their own role and function in this disturbed system. Such a showdown becomes particularly acute at the university and college level because the university is the leading edge for change in the societal-individual relationships.

For this reason, the mental health professionals employed in the university context are experiencing the showdown most acutely. The issues are sharply drawn by Szasz (1967) as a response to current texts on college mental health, particularly a text by Dana Farnsworth (1966). Szasz's main thesis is that the college psychiatrist is in reality a "double agent . . . serving both parties (students and administrators) in a conflict but owing real loyalty to neither" (p. 24). McNeil (1965) also questioned the role of the mental health person and leveled his criticism particularly at the role of the counselor and the counseling operation.

There is no existing social institution which is adequately meeting the requirements for the very early formation of the human potential. Therefore we must either invent a new institution or we must radically transform older institutions to meet the human crisis of our present social condition. The family, as we have hitherto conceived it, may be incapable of the kind of transformation necessary to rescue the large segment of our population from total social alienation. Perhaps some partial merger of the child-forming institutions of family and school might accomplish the Herculean task. Perhaps some totally new school form such as suggested in either the Frank Porter Graham Center or the Berkowitz and Rothman Clinic School might meet the need. Perhaps a totally new force, a third force in the development of children, may have to come into existence to buttress the family and the school in their developmental and socializing responsibility.

Whatever the solution, it will not be enough to have a few isolated research projects which demonstrate that we can offset mental retardation, character disorder, or mental illness by early intervention in the child's life. A massive social reconstruction effort will have to be made in order to give relevance to the isolated, scattered, and unorganized demonstration and research efforts which are taking place across the country. The desultory dabbling of a few mental health people in the turgid waters of education will certainly not bring about this reconstruction. If all of these separate and isolated efforts of mental health professionals and educators could be added together, their great energy, inventiveness, and potential might make a difference.

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CHAPTER V

Health Education

HERBERT L. JONES and EDWARD MILEFF

Health education research during the period 1962-68 dealt with both the content and the process of health education. If it can be said that there was a discernible trend with regard to this research, it would be in the direction of increased research activity within specific content areas of the larger field of health education. The focus of health education research studies is becoming better defined, if more specialized.

Educational methods and techniques in health instruction continued to receive considerable attention in the form of comparative effectiveness studies. Measurement of the achievement of health education objectives also remained at a high level. In this regard, the realization of broad program goals and pupil progress were studied.

National Projects

The largest project in the field of school health education over the past six years would have to be the School Health Education Study (hereafter referred to as the SHE Study) which was begun in September 1961 in an effort to improve health instruction programs in schools. Sliepcevich (1966) has identified the work of the first phase of the study as falling into five major areas: (a) publication of a monograph summarizing research related to instruction (Veenker, 1963); (b) a nationwide status study by Sliepcevich (1964) of selected large, medium, and small schools to determine health instruction program practices; (c) a survey of students' behavior in grades 6, 9, and 12; (d) development of a conceptual framework for the health education curriculum for K-12 and preparation of appropriate instructional materials; and (e) testing of the early experimental curriculum materials in four school tryout centers. Creswell, Hastings, and Huffman (1966) reported on the evaluation of the early teaching-learning guides of the SHE Study as they were applied at those tryout locations in the spring of 1965. They stated that the concept approach used in the development of the guides did reveal relationships among ideas which would help the student make generalizations and broader applications of his health knowledge.

The SHE Study listed health as a comprehensive, generalized concept having three dimensions—physical, mental, and social. Three key concepts served as unifying threads of the curriculum: growing and developing, interacting, and decision making. The conceptual framework is characterized by adaptability, flexibility, and permanence.

The theory underlying the conceptual approach to curriculum development in health education is that the identification of major concepts and supporting generalizations from a discipline facilitates the organization of its knowledge and forms a structure for developing meaningful relationships. One major finding from the initial work of the SHE Study is that classroom teachers appear to be more flexible and better able to deal with some kinds of health problems than might be expected. Interest in the study has been great, and it stands out as the most influential project of the past two decades that has supported the need for a sequential and comprehensive program of health instruction in public schools.

Cobb (1965) has attempted to test the hypothesis that health characteristics are definitely related to certain aspects of school performance. The development and implementation of the study was planned in three phases: (a) cooperative planning and developing of the research design; (b) developing baselines, interpreting findings, testing preliminary hypotheses, and formulating conclusions; and (c) corroborating hypotheses and testing appropriate interventions. Two advisory councils were developed to complete the first phase. The second phase began in November 1964 with the initial testing of 500 students from kindergarten and grades 1, 5, and 9. Health status was determined by a general physical examination, a dental evaluation, laboratory tests, evaluation of sensory and motor abilities, parent interviews, and pupil interviews. The study was designed to collect for analysis a wide range of information related to health, school performance, and family functioning. It was concerned with supplying answers and providing insight into the relationship between health characteristics of school-age children and their educational endeavors. The third phase was yet to be completed at the time of this progress report.

The most significant study in the field of public health has been the project of the National Commission on Community Health Services reported by Van Goor (1965). The commission, supported by the American Public Health Association and the National Health Council, was established as an independent, nonprofit corporation in 1962. The commission has undertaken two kinds of studies between 1962 and 1965: (a) self-studies in selected communities to determine how communities obtain action for needed health services, and (b) task force studies oriented to goal setting for communities throughout the nation. Three projects were undertaken to fulfill the commission's charge: (a) a community action studies project to explore the dynamics of community health behavior; (b) the national task forces project to deal with comprehensive care, environmental health, health services facilities, health services manpower, organization of community health services, financing community health services, and community assessment; and (c) the communications project. The work of the National Commission on Community Health Services (1966) resulted in the report entitled *Health Is a Community Affair.*

Additional References: American Journal of Public Health (1966); Smith (1964).

Health Education Programs in Higher Education

Johns and Le Masitre (1966) surveyed the 26 institutions of higher learning in the United States offering doctoral degrees in health education in 1963-64 to determine the status of these programs. They found a common philosophy and major purpose of professional preparation among the programs at these universities and colleges, with the graduate school the most common administrative body responsible for the doctoral programs. The doctor of education and doctor of philosophy degrees were the degrees most frequently offered. Facilities seemed adequate for the programs at most institutions, although research facilities were in need of improvement. The major needs, however, were for additional faculty and for students' scholarships. The mean number of health education faculty directly concerned with the doctoral program for all institutions was 4.35 and the median was 3.0. The quality of the faculty seemed to be the chief strength of the programs.

Means (1964) stated that the first known course on hygiene was offered in higher education in the United States at Harvard College as early as 1818. The course was required of all senior students. Amherst College offered anatomy presentations in 1823. Hygiene instruction of some kind was provided in 1884 in "61 percent of the 46 leading colleges and universities in the United States." Up to about World War II there was a fluctuating but general increase in college health education courses offered and required in this country.

Since 1946, status studies indicate a drop in the percentage of institutions of higher learning which require health education courses. Colleges and universities also appear to be dropping the basic required health course faster than they are adding it to their curriculum.

The Teaching-Learning Process

In writing about the implications that the behavioral studies held for the health educator, Tyler (1963) first called for a reassessment of the individual. Recent investigations more clearly indicate that the individual is a dynamic organism; he brings to the situations of life an active personality, directed not only by basic biological drives and needs but also by values, purposes, and goals. The health educator must devise programs which utilize the motivations that children have and help them develop more effective long-term motivation. In order to understand the health attitudes and practices of children and youth, the health educator can profitably examine the small groups and the social classes to which his pupils belong, for it is in these various small groups that the greatest development and modification of behavior takes place. The major implications of behavioral studies for health education revolve around the importance of (a) values in directing behavior, (b) motivation in learning,

(c) social groups in the development of children, (d) perception in guiding behavior, and (e) provision for conditions essential to imaginative learning.

Radelfinger (1965) designed a study to investigate the response to recommended preventive behavior presented in a fear-arousing communication. Communications involving high and moderate threats were read to the subjects. The behavioral response indicated that neither the moderate nor high fear message was effective in inducing the subjects to avail themselves of the preventive measure. In addition, there was no significant relationship between the belief that the measure was extremely effective in preventing the problem and the taking of the recommended action.

In a study involving 1,002 school-age children in Missoula (Montana), Lampert, New, and New (1966) endeavored to evaluate the effectiveness of moral influences versus a strictly factual information approach in discouraging smoking behavior. The data suggest that educational techniques utilizing moral appeals may be more effective in influencing school-age youth not to smoke than merely an objective presentation of scientific facts.

Tuck (1965) attempted to determine the effectiveness of a laboratory demonstration in motivation learning in the area of nutrition. A pair of white rats was put on the typically inadequate breakfast pattern of female teen-agers, which had been derived from diet studies of the 253 girls in the teaching situation. Two other experimental animals were placed on adequate breakfast patterns. The experiment with the animals was conducted jointly by the students and the teacher. For students, the nutrition levels in all nutrients improved—with the exception of calories—after diet results for the two sets of experimental animals were compared. Tuck concluded that the laboratory demonstration was an effective tool in stimulating and maintaining interest in the study of nutrition.

Gillespie (1967) conducted a survey of two groups of recent high school graduates from different environmental backgrounds to determine (a) media sources used for health information outside the school, (b) relative retention of health information from the various media sources, and (c) comparative attitudes toward daily, versus monthly, health publications. Both groups were relatively equal in intelligence and had equal opportunities to obtain information from high school health programs, but they came from socioeconomically privileged versus disadvantaged backgrounds. The privileged group relied primarily on written sources for health information in contrast to the disadvantaged group who depended primarily on television for such information. There was greater retention of health information from popular magazines than from the other media studies. The privileged students displayed a much broader interest in health concepts than did the disadvantaged group.

Scott (1963) determined the effects of a one-exposure mental health education film program, taking into consideration particular social and psychological characteristics of the participants and the influence of these factors in producing changes in specific information levels and attitudes. He administered pre-, post-, and retention tests. The criteria of effectiveness was the imparting of specific child-rearing information and the changing of specific parental attitudes. He found that (a) the brief program did impart information; (b) attitudes were changed following the film program, but the retention test indicated that the participants were returning to the preprogram position; and (c) income level and educational attainment were positively correlated with attitude and information change, although a need to consider individual differences was indicated.

Shindell (1964), in studying programed instruction, concluded that programing offered a means of increasing the effectiveness of teaching while conserving teacher time. He also reported on the extremely limited use of programed instruction in health education and called for more research into the feasibility and desirability of the use of programed instruction in this area. Podshadley (1965) reported on the feasibility of using a programed text with dental students. He concluded that programed instruction is effective and time saving. The results indicated that the student learns as well with the use of the programed text as he does with the use of the traditional lecture approach.

Fodor (1963) compared the effectiveness of the lecture method at the college level against combined multiple methods traditionally used in education at this level. Several instruments were used to measure knowledge change, applicability of knowledge, interest, and student support. While concluding that exclusive use of the lecture method was not desirable, he found no difference in knowledge and/or problem-solving ability. Interest did appear higher in classes where a variety of methods was used.

Barber (1962) studied the integration of health education content into other subject matter areas at the upper elementary level. A questionnaire, received from 132 selected teachers of the upper elementary grades, was used to determine the degree of integration of 118 health learning activities into other subject matter instruction. The social studies area seemed to be the area most conducive to the application of health content. The conclusion of the study was that all curricular areas are including health learning experiences, but many to only a limited degree. It was further concluded that health learning activities should be integrated more fully into all teaching situations at the upper elementary levels.

Kime (1965) determined that developmental tasks considered significant to youngsters in early adolescence were an excellent source of health interests of junior high school students. The results of a health interest inventory indicated that students showed significantly greater interest in the developmental task health questions than in the general health questions. This was true for students of all socioeconomic and IQ levels represented in the study. It was inferred from this that efforts in health education curriculum construction might well utilize health interests of students as they are identified in and derived from developmental tasks.

Dowell (1966) identified community health problems through a survey of 164 professional health workers in communities in northeast Arkansas and southeast Missouri, and then offered some health education implications for secondary schools. Specified as major health problems were (a) the effects of alcohol, drugs, and tobacco; (b) mental health; and (c) sex education. Concurrently, the areas of mental health education and sex education were the areas most neglected by the secondary schools, as reported by educators in the communities surveyed. It was felt that there was a relationship between the presence of these community health problems and the absence of pertinent health instruction in the schools. In the geographical areas included in this study, secondary schools needed to include more instruction in mental health education and sex education in their curricula. Also, it was found that the health interests and worries of secondary students differed at the various grade levels and between the sexes. The implications of these findings should be implemented in the specific topics offered as well as at the particular grade levels at which they are offered. More effective instruction was another need identified in certain health areas.

Additional References: Baber (1965); Gendel (1966); Humphrey and Slusher (1963); Sliepcevich (1964).

Knowledge, Attitude, and Behavior Change

Rosenstock and others (1966) drew a probability sample of 1,493 American adults and interviewed them about their knowledge, opinions, and behavior concerning fallout, pesticides, and fatty foods. Most of the adults interviewed had some correct information about each issue and thought each to be dangerous to personal health. The amount of correct information was correlated with race and positively correlated to educational attainment and income. However, the sex of the interviewee did not seem to be an important factor. The investigators felt that the mass media had apparently been effective in reaching the public and stimulating learning. A sense of danger had been communicated and, in the case of fatty foods, many people had been stimulated to reduce the danger by limiting their intake of saturated fats. The mass media seemed to be less effective with nonwhites, the poorly educated, and low income groups.

Kirscht and others (1966) interviewed the same sample population about their beliefs concerning cancer, tuberculosis, and dental disease. The beliefs studied included perceived severity of and susceptibility to each disease plus knowledge of the benefits that could be expected from various actions. The authors' findings indicated that health workers might well consider planning different educational programs for different diseases. For cancer and tuberculosis one should plan a program to increase simultaneously beliefs in susceptibility and awareness of the benefits of early detection. For gum disease one should try to increase the knowledge of susceptibility and demonstrate the benefits of preventive oral hygiene. It was felt that efforts to increase one's feelings of susceptibility without increasing the acceptance of perceived benefits may actually decrease the tendency to desirable action.

Baker, Frank, and Pangle (1964) developed a technique to identify health misconceptions utilizing an instrument which was not constructed specifically for that purpose. This was accomplished by providing students an opportunity for expressing a degree of certainty about the correctness of responses to a health test. The investigators administered the 100-item *Health Knowledge Test for College Freshmen* to 119 students. Each student responded by marking what he thought was the correct answer as well as marking the degree of certainty he had that the answer was correct. Twenty percent of the population tested answered at least 38 of the items incorrectly and yet had felt certain that their answers were correct. Heflin and Pangle (1966), using the same technique, tested 243 students. Their data were analyzed to examine the role of recent exposure to health instruction as a possible factor in reducing health misconceptions, to determine differences among students with different academic majors, and to analyze misconceptions according to areas in the health instruction program. The students were found not only to lack knowledge in many health areas but also to hold many misconceptions. Prior instruction and academic major had no influence on health knowledge.

Dzenowagis (1963) was concerned with safety misconceptions among a group of sixth-grade children. An instrument containing 50 misconceptions and 10 true statements was constructed from the literature with the guidance of experts in the field of safety. It was administered to 881 sixth graders in an urban community. The results testified to the fact that many safety misconceptions were held by these children. Haag (1963), in testing the health knowledge of prospective elementary teachers, felt that lack of knowledge of elementary teachers may have been partly responsible for the large number of health misconceptions held by schoolchildren. She administered a 130-statement health misconception test to 535 women students. The mean number of misconceptions held by this group was 47.6. Thirty-five of the statements were answered incorrectly by more than 50 percent of the respondents. This would seem to indicate the need for a greater role for health education in the elementary school teacher preparation curricula.

Garrett and Pangle (1966) found that the health interests of students enrolled in the required course in health education at George Peabody College were relatively stable. They based their findings upon appraisals made in 1959 and 1964. In both studies, the areas of interest which emerged from among 17 instructional areas included emotional health, family living, heredity, personal health, stimulants and depressants, and exercise and rest.

Corliss (1962) reported on a longitudinal study of health interests of students in the Denver schools. The study originated in 1947 with some modification of procedure in a 1957 follow-up. The main difference in procedure employed in 1957 was the greater student involvement in identifying the needs and interests to be used in the study. The earlier study committee had been composed of educators and relied totally on the literature.

The health needs and interests of the children were determined by a checklist used with 2,120 pupils in grades 7-11 in 1957. The findings were used as a basis for developing both the horizontal health education curriculum at each grade level as well as the vertical, sequential curriculum through the grades. The 1957 study indicated that some changes in the health curriculum were in order, particularly the incorporation of health information at an earlier age and grade level.

Scahill (1964) attempted to determine the influence of prior health instruction on the health knowledge level of college freshmen. She constructed an 85-item multiple choice instrument which was divided into nine content areas. She used this instrument to measure the health knowledge of freshman women, separating those with prior direct health instruction from those with no such instruction. The results showed that health instruction at the secondary school level is achieving one of its goals, that of increased health knowledge. At least this was the case with these freshman women. Dearborn (1963) administered a health knowledge testing instrument as a pre- and post-test to junior college students enrolled in 34 junior colleges in California. There were 3,720 students, predominantly freshmen, who took both tests. He noted striking differences in the health knowledge of students which illustrated the desirability of some type of homogeneous grouping for instruction. A general lack of knowledge also indicated the need for health instruction at the junior college level.

Additional References: Griffiths (1965); Young (1967); Young and others (1963).

Specific Health Issues

Mausner and Platt (1966) edited the report of a research-related conference held in 1965 on smoking behavior at Beaver College (Glenside, Pennsylvania) under a Community Cancer Demonstration Project Grant. The conference had three main objectives: (a) to explore techniques for the measurement of attitudes toward smoking, for the selection of samples for study, for the evaluation of the relationship between attitudes and decisions to stop smoking, and for assisting those who seek to stop; (b) to exchange information concerning ongoing research on smoking; and (c) to investigate the possible contributions to the control of smoking of current theoretical formulations in the behavioral sciences. Among the many aspects of smoking studied were the influence of mass communications, factors determining the decision to stop smoking, the practice of giving up smoking, the theoretical implications and guidelines for future smoking research. One of the most significant outcomes of the conference, and one which holds much for the health educator in trying to reach (teach) the smoker, was the delineation of smoking behavior types. Smokers were categorized into four types: (a) the habitual smoker who does not know when he is smoking, (b) the positive-effect smoker who uses tobacco as a stimulant and/or relaxant, (c) the negative-effect smoker who seeks to relieve stress, and (d) the addicted smoker.

In writing on the psychological aspects of smoking education, Horowitz (1966) stated that research demonstrates that group membership provides the single greatest support to the development and maintenance of individual habits. The educator must answer questions as to where the person gets the support for wanting to smoke and where the pressures against smoking originate. When one tries to change attitudes one has to look to the vulnerabilities or strains associated with group membership. Since smoking is so much a part of our culture, it is difficult for a youngster not to smoke when people he admires are smoking. Therefore what is said to the smoker must be plausible. Horowitz concluded by saying that a moderate degree of anxiety may be useful in smoking education, but too much anxiety leads to unpredictable behavior.

Hammond and Garfinkel (1968) reported on a longitudinal study of attitude and behavior change related to smoking. The study involved one million men and women. An analysis of the data revealed that between 1959 and 1965, the number of smokers was reduced from 45.8 percent to 35.8 percent among the men. Among the women studied, the number of smokers was reduced from 25.8 percent to 22.6 percent. Because of the practice of giving up smoking, there was a substantial net decrease in attained age–specific rates of cigarette smoking among men; however, the women witnessed a slight net increase in attained age–specific rates during the same years.

Swinehart (1966) studied the impact of the Surgeon General's Advisory Committee Report *Smoking and Health* (1964) on changes in beliefs, attitudes, and behavior of university students. The study was conducted in the spring of 1964. A group of 128 university students completed questionnaires two weeks, one month, and three months after the report was published. Each instrument contained some identical items concerning major findings of the report, acceptance of its conclusions, and actual and intended changes in smoking behavior. The study afforded an unusual opportunity to examine the unfavorable as well as the favorable effects of repeated warnings about the potential health damage of smoking in addition to the kinds of defenses that people use to avoid reacting adaptively to such warnings. Initially, one third of the sample was smoking, one third was classified as ex-smokers, and one third had never smoked. During the period of study there was a steady decrease in acceptance of the report—a drop from 46 percent immediately following to 30 percent three months later. There also was an increase in smoking and a decrease in recall of the major findings of the report. Swinehart suggested two hypotheses for future research: (a) messages repeated too often become ineffective and (b) messages which stress the personal and social consequences of health damage caused by smoking are more effective than those which stress only bodily damage. The conclusion was also drawn that education programs might have greater impact if communications were tailored for specific segments of a target audience rather than directed to the total audience.

Sallak (1961) administered an anonymous questionnaire to 2,130 public secondary school students (6 percent of a total secondary school population) to ascertain their current smoking practices and the rate at which they go beyond the experimental stage and become smokers. The study affirmed an earlier finding that a positive relationship exists between smoking practices of parents and those of their children. Urban youth were more often smokers and smoked more than did their rural counterparts. Fifteen percent began smoking before the seventh grade, which indicates that formal antismoking instruction needs to begin before this level. Sallak also stated that current educational procedures should be reviewed and tested for their significance and that in developing programs special consideration should be given to youth characteristics. It would appear that educators must gain a more precise understanding of motives involved in smoking and an understanding of the forces that deter or eliminate the desire to smoke. Evaluation of smoking practices of youth must be undertaken regularly to determine the effectiveness of instructional programs to discourage smoking.

In an attempt to determine the quality of education about alcohol provided for high school students by coaches, Russell and Waldrum (1962) developed a questionnaire and administered it to a sample of 218 high school coaches in California. Among the findings reported were the following: (a) 99 percent included abstinence as one of their training rules although their rationale for the rule was extremely variable, (b) 81 percent would drop an athlete who was caught drinking, and (c) 20 percent gave reasons for nondrinking which were actually misstatements of fact. This indicates that there is spotty and questionable alcohol education in teacher-training programs and that some coaches are uninformed, misinformed, or dishonest when talking to youngsters about alcohol. However, there did appear to be some well conceived, useful alcohol education provided by some coaches.

Kleber (1965) studied 21 college students in an investigation of the unsupervised use of hallucinogenic drugs. He found that the most common purposes for drug use were (a) to help with emotional problems, (b) to satisfy curiosity, (c) to provide a new experience, and (d) to allow the person to be one of the group. Some claimed that drug use had improved their lives, while one in four had experienced adverse effects.

Rosenblatt and Kabasakalian (1966) evaluated a venereal disease educational campaign which had been carried on by the New York City Health Department. The program was designed to counteract the growing venereal disease trend by disseminating information about the cause, nature, prevention, treatment, and effects of these diseases. The program was evaluated by determining the preexisting levels of knowledge of venereal diseases and the changes in knowledge following the educational campaign. The subjects were college freshmen, people under 18 years of age who had made application to a working paper clinic, and prison inmates. Data were obtained from a questionnaire. The results of the study indicated that while the campaign had been generally successful many subjects had not been influenced. The results suggested the need for a dialogue among the recipients of the information, especially in view of the differences within the groups.

Kirscht and Knutson (1963) related attitudes toward fluoridation of a public water supply to attitudes about science generally. Over 200 adults were interviewed prior to a fluoridation referendum. The interview contained both open-end and fixed-alternative questions. Attitudes toward science held by people both in favor of and opposed to fluoridation were generally favorable, although the attitudes toward science of those in opposition were somewhat less favorable. The antifluoridation group associated a significantly greater degree of concern with the undesirable effects of science or the "threat" of science.

Johnson and Belzer (1962) wrote of the paucity of experimental research on semantics, stating that the study of semantics was long neglected by psychological disciplines in favor of problems more susceptible to objective experimentation and less complicated by experimental variables. The authors felt this lack is significant when one considers that language determines the ideas, thoughts, and reactions that people hold. Johnson and Belzer studied the impact of "loaded words" before and after a course in sex education. They found that a positive attitude change occurred during the course of the instruction. Their study should call attention to the fact that language plays an important role in health understandings, attitudes, and behavior. The need for research of this kind, especially in the area of sex education, is implicit.

Additional References: Diehl (1967); Roberts, Grossman and Griffiths (1963); Zagona (1968).

Evaluation

Brickman and Meeker (1967) described the mental health consultation program in Los Angeles County. The program's purpose is to facilitate prevention of psychiatric disability among the schools' population through mental health consultation with and mental health education of the school staff. Private psychiatrists almost exclusively have done the consulting. The preliminary data of this study suggest that, notwithstanding the considerable difficulty in evaluating the effectiveness of such a program for either the teacher or the students, considerations which increase the satisfaction of the consultee include: establishment of optimal time limits for consultation, homogeneity of the consultees, knowledge of community resources by the consultant, the role of the consultant, and the organizational stability of the school system. These factors, along with the effects of consultation on the consultant, may well form the basis for the development of criteria which can more directly and specifically measure the effectiveness of mental health consultation in schools.

Lawrence (1966) found through an appraisal instrument of two forms, each having 45 illustrated situation-response items with multiple-choice answers, that junior high school students who need assistance in coping with emotional health problems could be identified. Specifically, pupils who needed help in the emotional health areas of self-acceptance, getting along with others, and facing reality were recognized among the several thousand junior high school students to whom the appraisal instrument was administered in two school districts in Los Angeles County, California. Analysis of the data showed the instrument to be valid and reliable. The use of the appraisal instrument also assisted teachers in extending positive—in a sense preventive—measures to help pupils in dealing with their behavior problems before they became pronounced.

Recent years have seen a proliferation of the development of classroom guides for health instruction which all too often are used without thought to their effectiveness or limitations. Cauffman (1963a) suggested several steps which are essential in evaluating such guides: (a) one should reexamine the aim and objectives of the guide and determine if the goals were met; (b) the evaluators should be those best qualified, usually the teachers; (c) the best techniques for evaluation should be identified before the process begins—interviews and questionnaires have proven the most fruitful to date; and (d) interpretation and the results should be implemented in the necessary revision of the guide to make it a useful, ongoing tool. Cauffman wrote of the needs in future curriculum development including the provision of administrative leadership, released time for those involved in the development, and use of the group decision process to settle differences. Since evaluation is such a necessary part of any curriculum project it should be included as an integral part of the overall planning, including that of the curriculum guide.

The *Health Behavior Inventory*, a standardized instrument which appraises health behavior and attempts to measure health needs in terms of practices, attitudes, and knowledge, was used by Cauffman (1963b) in testing the seventh- and eighth-grade students within one junior high school. Comparisons were made between the test scores of boys and girls, the two grade levels, and students with high and low attendance levels. An analysis of content areas and specific items was made. Girls scored significantly better than boys in the mean total test scores as well as in the knowledge and practice subpart scores of the inventory.

The dilemma of the gap between knowledge about and actual practices in health has been with us for years. It is a fundamental concern in the evaluation of health education programs. The presence of the gap is well supported by past research which has often yielded a poor correlation between these two outcomes. Veenker (1966) suggested that one of the reasons for this gap might be the lack of instruments which actually measure health practices accurately. He stated that health practice inventories are more likely to measure knowledge of the correct practice rather than use of the practice itself. Further, accurately assessing personal health practice and health understandings is an extremely difficult thing for individuals to do, since they frequently do not separate the two in their own minds. For a multitude of reasons, they often will not or cannot be honest with themselves.

Veenker reminded the reader that it is not health knowledge per se but the many and variable personal and social factors in school, home, and community life that determine the kind of health practices an individual will follow. The evaluation of health practices is not as simple as it may seem.

Research Needs

The Committee on Research Needs in School Health of the Research Council of the American School Health Association (1965) developed a list of needed research. Their report was organized into five major divisions with subsections under each: (a) school health services, (b) healthful school environment, (c) health science instruction, (d) school health coordination, and (e) general. The list was not intended to be all-inclusive, nor were any priorities attached. The list does demonstrate how sorely research in health education is needed and provides some breadth and depth to these needs.

Staton (1963) looked at the role of the school nurse in terms of research needed to delineate and clarify her responsibilities in schools. Several high priority research needs were identified in relation to school nurse activities. Willgoose (1962) wrote of research needs in the field of health education. He suggested 22 areas of needed research and explained that only when this research is forthcoming can the field of health education expect full acceptance in the overcrowded curriculum of today's schools.

In summation, the need for research concerning health education in schools is as great now as it has ever been, notwithstanding the studies completed to date and the advancement made in recent years. If research brings answers, it also breeds more questions and the need for further research. The wheel of progress turns over and over.

Additional References: Derryberry (1963); Doyle (1964); Hochbaum (1965); Mico (1965); Sheets (1966); Veenker (1965).

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CHAPTER VI

Sex Education Research

LESTER A. KIRKENDALL and GREG J. MILES

A burgeoning national interest in sex education has resulted in numerous conferences; a proliferation of curricula, outlines, and teaching aids; the formation of the national Sex Information and Education Council of the United States (SIECUS); and active expressions of interest and concern from many other organizations. Many questions have arisen which need empirical data and conclusions derived from and tested by research. Yet in perusing the sex education literature since 1956 as it pertains directly to formal school education, one finds an amazing paucity of research on structure, content, and results. That which is available is for the most part simplistic and often narrow in scope. The questions are there but data for answering them often are not.

Why does research in this area lag so seriously? Unquestionably for several reasons. Those educators who support sex education are commonly practitioners. They have worked with youth and sense their needs. Facing many obstacles and touchy issues in the development of programs, they are seldom calm, detached, objective researchers; they are more often organizers and activists. Moreover they are commonly educated to be teachers and/or community workers. Research is not their forte, nor does the public school provide a favorable climate for research. Elementary and secondary school teachers typically regard their pupils as unmarried and, for the most part, sexless. Research in sex education tends to shatter this image.

The most substantial research is done at the university level by persons attuned to behavioral research in sociology, psychology, or one of the related behavioral fields. However, there is much hesitancy and fear on the part of persons oriented to strict scientific objectivity lest they become involved in moralistic debate or involved with essentially unprovable value issues.

Finally, techniques and instruments for research in this area are poorly developed. Studies of sexual behavior and education have never been wholly respectable. Consequently research in this area bears less status and is generally less sophisticated than that in other behavioral areas.

Attitudes and Opinions on Sex Education

The terse explanations of most surveys of attitudes and opinions about sex education make it difficult to judge the validity of the data supporting the conclusions reported; usually little more than a summary of results is provided. In a National Education Association poll of a cross section of public school teachers, 79.3 percent favored sex education in high schools, 10 percent were opposed, 10 percent were uncertain, 13 percent favored its presentation as a separate subject, 40 percent preferred a specific unit in one or more other subject areas, 42 percent were for integration with one or more other subjects, and 5.2 percent wanted other arrangements. (*NEA Journal*, 1965) More men than women favored sex education, while elementary and secondary teachers were about even in pro-con opinions.

On the basis of a 38 percent response to a 4 percent proportional sampling of school administrators, *Nation's Schools* (1960) received replies as follows to a question about whether the public schools are responsible for sex education: (a) in elementary schools, 31 percent "yes," 44 percent "no," 25 percent "no opinion"; (b) in junior high schools, 58 percent "yes," 29 percent "no," 13 percent "no opinion"; (c) in senior high schools, 72 percent "yes," 17 percent "no," 11 percent "no opinion."

In a survey of national practices, *Nation's Schools* (1966) had a 43 percent response from a 4 percent sample of 16,000 administrators. Only 37 percent of the respondents indicated that their schools provided sex education and only 53 percent of these felt that their programs were effective. Small percentages indicated any existing programs in kindergarten through fourth grade. Most of the programs were in grades 5 through 9 with a definite falling off in senior high school. Only 23 percent of the districts without sex education planned to initiate a program within two years.

Johnson and Schutt (1966) queried 24 Maryland superintendents of schools (with a 75 percent return) and 135 Board of Education members (with a 50 percent return). Sex education was supported by 84 percent of the respondents; 50 percent felt it urgent. Inadequately prepared teachers and adverse parental reactions were cited as obstacles by 82 percent and 57 percent, respectively.

Sex Education Sources and Need

Home Inadequacy

Burchinal (1960), in a sampling of 117 Iowa farm girls, concluded that the majority did not receive intensive sex instruction from parents. Shipman (1968) administered a questionnaire to some 400 university students in marriage classes. His "striking" finding was that home sex education appeared "to be negligible for three of the parent-child relationships, i.e., father-son, father-daughter, and mother-son." Only in the mother-daughter relationship, wherein the range was from excellent to very poor, was it significant. Sex education (probably information on reproduction) was most satisfactorily handled with small children, and its effectiveness dropped sharply as the children aged. Shipman commented that his examination of studies since 1929 failed to reveal any appreciable improvement in the quality of parental sex education "in spite of the current suppositions about increasing societal sophistication in the area."

Youth Needs

Evidence is accumulating which suggests that complex heterosexual interests and interaction are now developing at younger ages than formerly. Broderick (1966a) advanced theoretical and historical considerations and linked these with Kinsey's (1948) data to support his view. He argued that the common question, At what age should sex education begin? should really be, How can persons best be helped to cope with their sexual experiences and potential at any age? Yet the well known reluctance of adults to acknowledge children's sexual interests and behavior means that childhood investigations and experiences usually precede formal instruction in home or school.

Broderick (1966b), in a cross-sectional study of children aged 10 to 17, found data suggesting "a real continuity between prepubertal attitudes and experience and those of adolescence." Broderick and Fowler (1961) have also presented evidence that while interpersonal heterosexual relations between preadolescents have been starting at earlier and earlier ages and have been becoming more liberal and humanistic, the old patterns of hostility and withdrawal between the sexes at the time of puberty are still discernible. An increase in early cross-sex sexual experimentation and early marriage rates and greater difficulties in finding clearly defined and generally accepted social sex roles are likely to occur. Broderick and Rowe (1968) published a five-item Guttman-type scale of social heterosexuality developed with a sample of 1,029 ten- to twelve-year-old children. This scale would permit a teacher to ascertain his pupils' stages in the social heterosexual progression.

Brown (1959) analyzed questions anonymously submitted over a 10-year period by 1,213 ninth-, eleventh-, and twelfth-grade pupils. He found little concern with parents and intrafamily relations but much more concern with preparation for marriage and parenthood. While sex education questions of a factual, physical nature made up only 1.5 percent of the total for the ninth graders and 8 percent for the twelfth graders, two thirds of the questions of the ninth graders centered about interpersonal relationships with members of the other sex and about dating problems. The spread of problems for the twelfth graders was greater with this group and showed concern with interpersonal relationships, dating problems, ethical and moral questions, and issues relating to love, engagement, and marriage.

Kirkendall (1967) investigated the sexual decision making of college students. A group of 131 college males reported having been involved in

558 situations requiring decisions of both acceptance and rejection by both the male and the female concerning heterosexual intercourse. He related the decisions to various factors: for example, religious devoutness, family background, and age at which dating began.

Angrist (1966) in an exploratory interview study of 50 freshman women found 85 percent had discussed birth control both in high school and college. While nearly all desired more authoritative information, they seemed to view contraceptive information as peripheral to their central interest in sexual behavior and standards. Keller (1959a, b) developed a misinformation questionnaire which, when administered to 400 college students, showed that females have significantly less information than males. Socioeconomic status and religion seemed to have no relation to the amount of misinformation. Men had significantly more misinformation about menstruation and heredity than women, and the females were more significantly misinformed about venereal disease.

McCreary-Juhasz (1967) asked 893 students at the University of British Columbia to rate the adequacy of their knowledge about human sexuality. They were then given a sex knowledge test covering nine topics. No relationship was found between their self-ratings and their test scores. Both sexes tended to over- and underestimate their knowledge on particular topics, and their greatest underestimation was on the topics of menopause and contraceptives.

Ignorance is not confined to children and the masses in the college population. Greenbank (1961) found that half of the 1959 graduates of a Philadelphia medical school agreed that mental illness was frequently caused by masturbation.

Evaluation of Outcome

Evaluation of outcomes is difficult when objectives are as varied and intangible as they often are in sex education. The most tangible outcomes are changes in test scores. The sex information of college-level males and females, using the McHugh *Sex Knowledge Inventory*, was studied by both Perkins (1959) and Bardis (1963). Perkins used a class of biology students but not a control group, and Bardis used both a group enrolled in family life education and a control group. Each investigation found significant gains over the period of the duration of their courses. In both studies, males tended to score higher than females on the pre-tests but these differences were largely erased on the post-tests.

Olson and Gravatt (1968) studied attitude changes occurring in marriage and family living courses. The attitudes of 97 students who had completed a functional marriage course showed a significant change in the direction of similarity to their professors' attitudes. The students indicated more comfort in expressing feelings about love and marriage and less embarrassment in talking about sex to members of the other sex. Their 48-item Premarital Attitude Scale appears in the article.

The Expanding Psychosocial Dimension

Sex education has long been considered a phase of instruction which ideally should be given in the home. The purpose has been to inform children about physical growth and development, to give details on reproduction, and, above all, to repress (or at least keep from sight) all premarital sexual activity. Sex was considered a physical process. That the character of sexual expression might be influenced by personality factors and environmental or cultural considerations or extended beyond the family seldom occurred to parents or to sex educators. Consequently sex education has been a relatively simple matter of transmitting specific facts.

Changing social and cultural circumstances (for example, a greater openness about sex; a collapse in the power to motivate for chaste conduct by instilling fears of possible premarital pregnancy, venereal infection, or community censure; cross-cultural exchanges; changing sex roles; a mounting body of research which has exposed new facets of sex) have combined to topple these insular views. No sex education program can be effective today without taking these developments and others into account.

Additional References: Bell (1966); Kirkendall (1964); Kirkendall (1965); Reiss (1960).

Sex Roles

Modern sex educators emphasize the need to extend sex education to include role expectations and behavior. A fairly extensive body of research literature is growing up around this emphasis. Studies relating role expectations and behavior to certain background factors will be of particular interest to educators.

Brown (1956) investigated the nature and extent to which 156 kindergarten children displayed preferences for objects and activities characteristic of their own or the opposite sex. His data suggest the existence of definite, relatively dichotomous sex-role patterns in young children. Boys display a stronger preference for the masculine role than do girls for the feminine role.

Dunn (1960) found in a study of 436 white high school seniors that both males and females held equalitarian views on seven areas of family life: authority, child care, personal characteristics, social participation, education, homemaking, and employment and support. More traditional views were expressed toward the latter two areas than toward the other five. Girls tended to be slightly more equalitarian than boys, except on the latter two areas. Dunn regarded certain of the seniors' role expectations as unrealistic or confusing.

A sex-role identification symposium was reported in the *Merrill-Palmer Quarterly* (1964). Here several students of sex-role behavior reviewed past research, added findings, extended theoretical formulations, and developed hypotheses. Four papers with quite extensive bibliographies will aid persons wishing to pursue this subject.

Lynn (1962) reviewed research and presented a theoretical formulation from which several hypotheses flowed. A major assumption guided Lynn: namely, that male children tend to identify with a cultural stereotype of the masculine role, whereas females tend to identify with their mothers' roles as they perceive them. Kagan (1964) accomplished an extensive synthesizing task and presented an extensive bibliography. Kagan and Moss (1962) explored the extent to which adult performance in various sex roles could be anticipated from childhood behavior. Lynn (1966) synthesized theoretical formulations concerning sex-role identification and arrived at 13 hypotheses which provide helpful insights.

Since sex-role expectations and behavior are apparently affected by sex, social class, family background, race, and marital status, knowing the nature of these relationships would be of importance to educators working with sex education and family life programs. Dyer and Urban (1958), Hartley and Klein (1959), Podell (1966), and Reiss (1964a) have also done sex-role research.

Personality Factors

Kanin (1965) was interested in the classical psychiatric syndrome which sees the sexually aggressive male as one who is (a) generally hostile toward women as a consequence of an unhappy mother-son relationship, (b) compensating for psychological femininity or latent homosexuality through short, sporadic, intermittent periods of strong sex drive which lead him to be aggressive, (c) generally aggressive in his life style. Kanin's data based on 341 university men did not support the first two hypotheses, but moderate support was found for the third hypothesis.

Kanin (1967) in an investigation of sexual aggression concluded that while constitutional factors are the basis of the sexual impulse, "variations in sexual interest . . . are primarily due to social and psychological factors," i.e., factors susceptible to educational influences. His data suggested that the sexual frustrations which aggressive males experience are not the consequence of physiological conditions, but rather the result of the high aspirations they have for the satisfaction obtained through intercourse. Frustration is a quality more common to the sexually active (in the sense of obtaining intercourse) than the sexually deprived male.

Junior and senior high school youth were studied by Loeb (1959) in an attempt to differentiate between participants and nonparticipants in premarital intercourse. He concluded that teen-agers who trusted themselves and their ability to contribute to others and had learned to rely on others socially and emotionally were least likely to be involved in irresponsible sexual activity. Teen-agers who were comfortable in their appropriate sex roles were least likely to be involved in indiscriminate sexuality.

Kagan and Moss (1962) considered the stability of youthful heterosexual behavior and attempted through longitudinal records to understand the character of adult sexuality. They found that boys, ages 10 to 14, who did not date during this age period, did not establish intimate heterosexual relationships or engage in erotic activities in late adolescence. They also found that participation in erotic activity creates more anxiety among females than among males.

Ehrmann (1957) in a survey of sex research noted that the research provided little understanding of how persons incorporate ideas about sex into their self-concepts.

Premarital Pregnancies

Vincent (1961, 1966) gave particular attention to unwed mothers. His earlier study sought to establish the characteristics of unwed mothers by extending the sample beyond those girls found in homes for unwed mothers or those in the lower socioeconomic class. Obtaining the help of private physicians who made referrals to him, he was able to show that the characteristics as set out in earlier studies resulted in stereotyping all unwed mothers as psychological problems—as girls who were escaping, defying parents, or working out some other personality difficulty. The 1966 publication provided data on trends in illegitimacy.

Landis (1965) compared data obtained in a 1954 survey and a 1964 follow-up in California on incidences of premarital pregnancies and school policies on handling them. A third of the schools reported an increase in premarital pregnancies and 9 percent reported a decrease. The greatest increase was in cities having a population of 10,000 or more. Schools in small communities were the most likely to suspend pregnant, unwed girls, but a shift toward more accepting attitudes occurred between 1954 and 1964. During these years more adequate provisions for educational instruction in the girls' homes were set up by more schools.

Henton (1964), using a 16-item survey form, found no significant differences in attitudes on dating and sex among pupils in schools admitting and prohibiting attendance of married pupils. She concluded that restrictive attendance policies served no useful purpose.

College girls' knowledge of contraceptives was found by Grinder and Schmitt (1966) to be quite closely associated with youth-culture variables: for example, age of beginning dating, age of men dated, frequency of dating, being in love, and engaging in sexual intercourse. Peers seemed to emerge as a source of accurate contraceptive information. The authors suggested that the information possessed was extensive enough to protect these girls from pregnancy if they and their sexual partners used it conscientiously.

Additional Reference: Gebhard and others (1958).

Cross-Cultural Comparisons

Christensen (1966) studied the normative attitudes toward sex in three cultures—the Danish, Midwestern United States, and the Mormon country (Utah and parts of surrounding states). He used questionnaires with university students in each of the cultures. He also used record-linkage data acquired by matching marriage records for selected years with birth and divorce records. This provided data on time between marriage, birth of first child, and associated factors. Sex norms ranged from the relatively permissive Danish society, to the Midwest which is taken to be near the national average, to the highly conservative Mormon culture. Danish subjects more than the others participated in premarital intercourse, but they confined it to a "steady." Danish couples were also more likely to give birth to an illegitimate child. In the more restrictive Mormon culture, more of those who had premarital coitus felt guilt and a sense of obligation than did those in any of the other cultures. With regard to the premaritally pregnant, Mormons tended to marry even before the pregnancy was confirmed, Midwesterners as soon as it was confirmed to two months afterwards, and the Danes did not let the pregnancy rush them into marriage. Danish marriages commonly took place about five months after conception. The percentages by which divorce rates in the premarital-intercourse marriages exceeded those in the postmarital-pregnancy groups were just reversed—the more hurried the marriages, the higher the divorce rate. Christensen concluded that both norm violation and feelings of guilt and anxiety varied directly with norm restrictiveness. (See Christensen's bibliography for his other articles.) Reiss' (1967) findings in his national probability sample also indicated that restrictive norms increased the probability that the play of social forces would alter individual standards in the direction of permissiveness.

Schofield (1965), using random sampling and an interview technique, presented data on the sexual behavior of English youth (934 boys and 939 girls, 15 to 18 years of age). The definite similarities between the English and the American cultures make the following findings of special interest: (a) early dating and early experience with minor heterosexual activities are linked with earlier-than-average initiation into intercourse; (b) sexual experience is closely related to the availability of facilities in which intercourse can occur; (c) sexual experience is related to the extent to which the teen-agers have accepted "the teen-age mythology" created by TV, press, and radio; (d) teen-agers who are no longer closely tied to their families and who tend to reject adult standards and values as a matter of principle are much more likely to be among the sexually experienced; (e) the sexual behavior of teen-agers is markedly influenced by male-female roles which they have come to accept; and (f) sexual experimentation among boys appears to be an almost inevitable outcome of verve, high spirits, an interest in exploration, and a normal, desirable curiosity about life and the world. Girls are seemingly less often impelled by these forces, but probably because the risks are greater for them rather than because these forces are not present among females. Patterns of sexual behavior were also related to such factors as educational and family backgrounds, leisure-time activities, and personal attitudes.

Schofield suggested that sex education, as these teen-agers had experienced it, seems to have had remarkedly little effect on their patterns of sexual behavior. Lack of knowledge about contraception, contrary to the hopes of many adults, does not seem to be any deterrent to participation in intercourse.

Ollendorff (1966) was concerned with how juvenile homosexual experiences related to adult homosexuality. He took the Freudian point of view and reinterpreted it from anthropological research, including his own. He traced the development of juvenile sexual experiences as they are seen in sex-permissive and sex-denying societies. He asserted that "homosexuality is a condition which appears only in sex-negating societies" which give rise to homosexuality by sex-negating patterns of upbringing which in turn result in neurotic illnesses.

Additional Reference: Bernard (1961).

Social Class

Rainwater (1965; 1966a, b) did extensive research on sexual attitudes in lower socioeconomic classes and in Negro youth as these attitudes relate to contraception, premarital sexual patterns, sex roles, and marriage. His work is indespensible for sex educators concerned with cultural and subcultural impact on sexual patterns.

Rainwater (1960) suggested several reasons why contraceptive techniques were ineffective with couples in the lower socioeconomic classes. One reason was that the couple know so little about their own sexual and reproductive physiology that they do not know what they are trying to accomplish, physiologically, with a contraceptive technique or device. Another was the difficulty which lower class males and females find in talking with each other about sex. This is simply not a subject about which they communicate freely. Still another reason was that the male's perception of success in the masculine role is to beget children. Thus, contraception is either likely to be resisted by the male or left entirely up to the female. Clearly these attitudes and circumstances should be subject to modification by education.

Schofield's (1965) data revealed social class differences. Middle class children tended to obtain sex education earlier than lower class children, and more of their sex education came from the home. This was especially true for middle class girls who may menstruate earlier. Boys who were "early starters" in intercourse were more likely to come from middle class homes and were also more promiscuous. Deep kissing seemed more acceptable among middle class than among lower class youth. The common stereotype of the lower class home with a free and easy attitude toward sex was not supported; rather, the reverse was true. The role of the teacher as sex educator for lower class children takes on added importance when viewed in the light of these data.

Race

Reiss (1964a) in his national probability sampling of 903 high school and college students, ages 16 to 22, tested four hypotheses with reference to the relationship between racial differences and sexual permissiveness: (a) He hypothesized that Negro-white differences in attitudes toward permissiveness existed. They did and they were highly significant. (b) He expected to find permissiveness negatively associated with religious interest and allegiance. There was a significant negative association for the whites but not for the Negroes. Reiss felt that the emotional character of Negro religious participation as compared to the more austere religious concepts of the whites might account for this. (c) He expected romantic love to be negatively associated with permissiveness. Among whites, those who put less emphasis on romantic love were likely to be significantly more permissive. (d) Finally he hypothesized that the more often subjects reported having been in love the more permissive they would be. This was true for the whites, with a weaker significance for the men than the women. The direction of the association was the same for Negroes, but the association was weak and insignificant.

Reiss noted that whites who are low on church attendance and on romantic beliefs were more likely to be permissive. These characteristics were less closely associated with permissiveness in the Negro group. He remarked that sexual permissiveness can be generated and maintained in cultural milieus which differ much in basic assumptions. He concluded that the lower the traditional level of sexual permissiveness in a group the greater the likelihood that social factors will alter individual levels of permissiveness.

Demands on Sex Educators

Effective sex education can no longer be devoted to repressing sexuality nor confined to the giving of factual information. The integration of sexuality into responsible living demands a breadth of understanding based upon in-depth knowledge and insights.

One of the most common objections to sex education is that inadequately trained teachers will be called upon to handle the subject. Johnson and Schutt (1966) reported 82 percent of their respondents as having this objection. A survey by Malfetti and Rubin (1968) is relevant. Their study of 734 teacher preparation institutions (34 percent response) showed that only 8 percent offered "a specific course or courses intended to prepare teachers to teach sex education."

Keller (1959a, b) felt that her study of students' knowledge had implications for teaching methods. She stated that sex education was often simply impressed in an authoritarian way. She argued that teachers should approach the subject from a psychological and sociological point of view and that varied teaching methods are needed. The rational authoritarian does not succeed in correcting misinformation. Teachers are needed who will accept both the pupils and their ideas and who are trained in nondirective techniques enabling them to cope with open, free class discussions.

Knowledge of sexuality as related to hormones, physiological development, and gender-role learning is a recent but rapidly developing field. The sex educator and counselor who wishes (and needs) to build a basic background will find much valuable information in such publications as Hampson and Hampson (1961), Money (1961), and Winokur (1963). These studies which make an important and distinctive contribution are not for the public school classroom, but rather for the sex educator who wishes to know in depth.

Brown and Lynn (1966) have provided a short and useful paper based upon research. They provided a synthesis in which human sexual development is seen from three points of view—sexual structures and functions, sex-role identification and behavior, and genital arousal.

An insightful, knowledgeable teacher must know something of the nature and extent of intergenerational conflict over sexual values. Bell and Buerkle (1961) compared the attitudes of 217 co-eds with those of their mothers concerning the moral assessment of mothers and daughters in regard to virginity at the time of marriage and sexual intercourse during engagement. On both questions the co-eds were clearly more liberal than their mothers. Yet studies of incidence figures for premarital intercourse suggest that the number involved in premarital intercourse has changed little since the 1920's. One wonders what conflicts between their value expressions and their behavior are involved for these mothers.

Reiss (1964b) also found differences in youth-adult attitudes toward petting during engagement and toward intercourse during engagement. Sixty-one percent of adults and 85 percent of high school and college students approved of petting for engaged males. For engaged females 56 percent of the adults and 82 percent of the students approved of petting. Intercourse for engaged males was approved by 19.5 percent of the adults and 52 percent of the students; 17 percent of the adults and 44 percent of the students would accept intercourse for engaged females. Thus adults were consistently more conservative both with respect to petting and to intercourse in engagement than youth. These data were obtained through the use of a 12-item Guttman-type scale used to measure male-female attitudes toward sexual permissiveness. The derivation of the scale and its final form are reported.

Communication concerning sex is poor between generations. It is especially difficult when one generation assumes attitudes on the part of the other which are essentially nonexistent. Guilt is a case in point. In a study of upper middle class college girls, Freedman (1965) found that guilt feelings were very little in evidence among those who had had intercourse. The predominant attitude was that of satisfaction and enjoyment.

Additional References: Christensen (1964); Ellis and Abarbanel (1967); Reiss (1960).

Theoretical and Programmatic Implications

With a bit of hyperbole one can suggest a point of view which has vast (though not new) implications for educators. With the probable lower age of physical maturity (Moss, 1965), the increasing interest in heterosexual activities of youth at ever younger ages (Broderick and Fowler, 1961), the relation between sexual activity of adolescents and their acceptance of the mass media "teen-age mythology" of sex (Schofield, 1965), the evidence that youth are repeatedly involved in sexual decision making (Kirkendall, 1967), the finding that the average age at which a group of young men experienced their first intercourse was 17.1 years (Kirkendall, 1961), and evidence that puberty often represents a crisis, with petting and sexual encounters adding further to youth perplexities (Shipman, 1968), the educator is called upon to recognize that junior and senior high school youth are living at a high level of sexual activity. The issue is not whether youth will be educated about sex, but rather whether the education will be left to the mass media and the peer group, or whether the school will participate effectively.

Research Reorientation

Research in sex was initially taxonomic in nature. The researchers were occupied with the incidences and frequencies of various forms of sexual behavior. Some of the more pretentious studies broke the total population into subgroups and related these subgroups to certain background factors, as did Kinsey. What is now noticeable is an increasing concern both in sex education programs and in sex research for sex as an aspect of interpersonal relationships.

Kirkendall (1961) conducted a study centered upon understanding the tie between interpersonal relationships and premarital intercourse. He studied the significance of three components of an interpersonal relationship—motivation, communication, and attitudes toward the assumption of responsibility—for assessing the consequences of premarital intercourse. Two hundred college-level males reported sexual liaisons with 668 females. A continuum of affectional involvement was devised and the liaisons were arrayed along it. The continuum was divided into six segments or levels ranging from the prostitute level where affection was rejected as a part of the relationship, to the fiancée level where deep affection was involved. The components of the relationship were found to change their character from one segment of the continuum to the next.

The study provided clear evidences that considering premarital intercourse as an undifferentiated experience—as though intercourse with a prostitute could be equated with intercourse with a fiancée—submerged many nuances and shades of meaning. Until these interpersonal differentiations are recognized, the chance of realistic education concerning the character of premarital intercourse is small.

Kirkendall went further and assumed that a concern for interpersonal relationships of integrity and honesty provided the basis for moral decision making. He therefore considered that his study reinterpreted the traditional approach to morality and offered insights which would be helpful in moral decision making.

Ehrmann (1959) devised a continuum of physical involvement in order to study the progression of couples through increasingly intense stages of physical intimacy as they moved into or rejected intercourse. He found that the degree of physical intimacy which a couple experienced or considered permissible was "among males *inversely* related and among females *directly* related to the intensity of familiarity and affection" which characterized the couple's relationship.

In surveying research findings, Kirkendall and Libby (1966) noted that responsible sexual behavior, satisfying interpersonal relations, and personal development are becoming more and more closely related, and need to become so in sex education.

Additional Reference: Sagarin (1968).

Increasing Permissiveness

Sex education programs will apparently be extended in an atmosphere of increasing tolerance for forms of extramarital sexual expression and with ideologies which stress individual choice and responsibility in contrast to social control and adherence to rigid societal norms.

Robinson and others (1968) gave a questionnaire to 244 students at the University of Georgia. They found no major change in reported incidences of premarital intercourse or petting as set forth by Kinsey (1948). However, they did find an attitudinal shift in which aspects of sexual behavior are more and more regarded as matters of individual responsibility. Only a third of the subjects acknowledged that the community had any right to be concerned with an individual's sexual behavior; 85 percent of the males and 75 percent of the females agreed that sex was a person's own business. Sex was accepted as a religious issue by 41 percent of the males and 49 percent of the females. Both sexes generally held to the double standard, but surprisingly fewer of the men than the women.

Stratton and Spitzer (1967) tested and found moderate support for the hypothesis that a sexually permissive attitude was associated with an unfavorable self-concept. Some 325 unmarried students were given four personality-measuring instruments. Stratton and Spitzer noted two general lines of inquiry into the question of sexual permissiveness—the clinical and the survey. Persons using these two approaches seem to make different assumptions in the beginning and so end up with different conclusions.

Moss (1965), after reviewing cross-cultural demographic data, suggested that sexual stimuli which will affect youth are increasingly present in the urban social structure, particularly in the United States. Official standards accept more openness and a greater degree of youthful heterosexual intimacy than heretofore. Sexual satisfaction and happiness for both sexes is becoming more widely recognized and accepted as a legitimate life goal. Moss suggested that, as a consequence, one may presume generally less sexual inhibition in children and an increased awareness of love and sex impulses in the individual.

Reiss (1967) collated and examined research findings and provided the sociological rationale for the development of permissive attitudes. Attitudes toward and the acceptance of sexual permissiveness are the outgrowth of such factors as urbanism, decline in religious controls, a generally more permissiveness attitude in society, and the increasing extent to which youth control courtship patterns of behavior. Mann's (1967) study of the premarital patterns of Canadian youth supports Reiss' views.

Additional References: Pope and Knudsen (1965); Reiss (1960).

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